

INFECTIOUS DISEASES OF MADAGASCAR



Stephen Berger, MD

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E-BOOK SERIES

2017 Edition

Infectious Diseases of Madagascar - 2017 edition

Stephen Berger, MD

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Scope of Content

Disease designations may reflect a specific pathogen (ie, Adenovirus infection), generic pathology (Pneumonia - bacterial) or etiologic grouping (Cotiviruses - Old world). Such classification reflects the clinical approach to disease allocation in the Infectious Diseases Module of the GIDEON web application. Similarly, a number of diseases which are generally diagnosed and treated outside of the field of Infectious Diseases are not included, despite the fact that a clear infectious etiology exists. Examples include Peptic ulcer, Creutzfeldt-Jakob disease, Human papillomavirus infections, etc. In contrast, a number of other entities of unknown etiology which do present to Infectious Diseases specialists have been included: Kawasaki's disease, Chronic fatigue syndrome, Kikuchi and Kimura diseases. Several minor infections having minimal relevance to the field of Infectious Diseases are not covered: Paronychia, Otitis externa, etc.

Introduction: The GIDEON e-book series

Infectious Diseases of Madagascar is one in a series of GIDEON [ebooks](#) which summarize the status of Infectious diseases, Drugs, Vaccines and Pathogens in every country of the world.

Chapters are arranged alphabetically, by disease name. Each section is divided into four sub-sections:

1. Descriptive epidemiology
2. Status of the disease in Madagascar
3. References

The initial items in the first section, Descriptive epidemiology, are defined as follows:

Agent	Classification (e.g., virus, parasite) and taxonomic designation.
Reservoir	Any animal, arthropod, plant, soil or substance in which an infectious agent normally lives and multiplies, on which it depends primarily for survival, and where it reproduces itself in such a manner that it can be transmitted to a susceptible host.
Vector	An arthropod or other living carrier which transports an infectious agent from an infected organism or reservoir to a susceptible individual or immediate surroundings.
Vehicle	The mode of transmission for an infectious agent. This generally implies a passive and inanimate (i.e., non-vector) mode.

A chapter outlining the routine vaccination schedule of Madagascar follows the diseases chapters.

Content

There are 357 generic infectious diseases in the world today. 219 of these are endemic, or potentially endemic, to Madagascar. A number of other diseases are not relevant to Madagascar and have not been included in this book.

In addition to endemic diseases, we have included all published data regarding imported diseases and infection among expatriates from Madagascar.

Sources

Data are based on the GIDEON web application (www.gideononline.com) which relies on standard text books, peer-review journals, Health Ministry reports and ProMED, supplemented by an ongoing search of the medical literature.

The availability and quality of literature regarding specific infectious diseases vary from country to country. As such, you may find that many of the sections in this book are limited to a general discussion of the disease itself - with no data regarding Madagascar.

This is a book about the geography and epidemiology of Infection. Comprehensive and up-to-date information regarding the causes, diagnosis and treatment of each disease is available in the [GIDEON web application](#). Many of the diseases are generic. For example, such designations as Pneumonia bacterial and Urinary tract infection include a number of individual diseases. These appear under the subheading, Synonyms, listed under each disease.

Exploring Outbreaks and Surveys

Outbreak and survey charts are designed to allow users to quickly scan and compare publications according to year, setting, number of cases / deaths, affected population and other parameters. Linked references are displayed where available.

Parallel charts in the [GIDEON web app](#) allow for sorting within columns. In the following example, data are displayed alphabetically by outbreak setting or region.




Years	Region	Setting	Cases	Deaths	Source	Pathogen	Years	Region	Setting	Cases	Deaths	Source	Pathogen
1990	Alberta						2013*		airplane			eggs	Heidelberg
1999	Alberta		12		pet food	infantis	1966		bar mitzvah	34		fish	Java
2004	Alberta	restaurant	31			Heidelberg	1984	Ontario	day nursery	22			typhimurium
2010 to 2011	Alberta		91		food	enteritidis	1992*	Ontario	hospital				enteritidis
1960	British Columbia		65				1997*	Montreal	hotel				enteritidis PT 8
1985 to 1986	British Columbia		13		chocolate	nirma	1982	Quebec	nursery			milk	typhimurium
1995 to 1996	British Columbia		133		sprouts	Newport	1983 to 1986	Halifax	nursing home	51			Newport
2000	British Columbia		47		baked goods	enteritidis	2011	New Brunswick	nursing home	7	1		
2000	British Columbia		62		eggs		1999	Edmonton	restaurant	27			typhimurium
2005*	British Columbia				baked goods		2001	multiple sites	restaurant	12		sprouts	enteritidis PT 11b
2008	British Columbia		64				2004	Alberta	restaurant	31			Heidelberg
2011	British Columbia		8			agbeni	2005	Ontario	restaurant	81			
							2016	Toronto	restaurant	43			
							2012	Ontario	school	46		catered food	
							2007	Ontario	university	85		food	typhimurium PT 108

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* Not endemic. Imported, expatriate or other context reported.

⁺ Country specific note exists for disease

Acanthocephalan infections

Agent	PARASITE - Archiacanthocephala. Moniliformida: <i>Moniliformis moniliformis</i> , Oligocanthonynchida: <i>Maracanthorhynchus hirudinaceus</i> .
Reservoir	Pig (<i>Maracanthorhynchus</i>), rat and fox (<i>Moniliformis</i>),
Vector	None
Vehicle	Insect ingestion
Incubation Period	Unknown - presumed 15 to 40 days
Diagnostic Tests	Identification of worm in stool.
Typical Adult Therapy	Infection is usually self-limited. Pyrantel pamoate has been used against <i>Moniliformis moniliformis</i> - 11 mg/kg PO - repeat once in 2 weeks
Typical Pediatric Therapy	Infection is usually self-limited. Pyrantel pamoate has been used against <i>Moniliformis moniliformis</i> - 11 mg/kg PO - repeat once in 2 weeks
Clinical Hints	Most infections are characterized by asymptomatic passage of a worm In some cases, only vague complaints such as 'perumbilical discomfort' and 'giddiness' have been described
Synonyms	Corynosoma, Macracanthorhynchus, Moniliform acanthocephalan, <i>Moniliformis moniliformis</i> . ICD9: 128.9 ICD10: B83.8

Acanthocephalan infections in Madagascar

Human and animal infections by *Macracanthorhynchus hirudinaceus* have been identified in Madagascar. [1](#) [2](#)

References

1. [Rev Elev Med Vet Pays Trop 1966 ;19\(3\):277-82.](#)
2. [Med Trop \(Mars\) 1968 Mar-Apr;28\(2\):139-42.](#)

Actinomycosis

Agent	BACTERIUM. Actinomycetes, <i>Actinomyces</i> spp. Anaerobic gram-positive bacillus
Reservoir	Human (oral, fecal and vaginal flora)
Vector	None
Vehicle	Endogenous
Incubation Period	Unknown
Diagnostic Tests	Gram stain and bacteriological culture using strict anaerobic technique. Growth is apparent in 3-7 days.
Typical Adult Therapy	Ampicillin 50 mg/kg/day IV X 4 to 6 weeks - then Amoxicillin 1.5 g/d PO X 6 months. OR Penicillin G 10 to 20 million units/day X 4 to 6w; then Penicillin V X 6 to 12m. Alternatives: Doxycycline , Ceftriaxone , Erythromycin Excision/drainage
Typical Pediatric Therapy	Ampicillin 50 mg/kg/day IV X 4 to 6 weeks - then Amoxicillin 20 mg/kg/day PO X 6 months. Penicillin G 100,000 units/kg/day X 4 to 6w; then Penicillin V 25,000 units/day X 6 to 12m. Excision/drainage
Clinical Hints	Mandibular osteomyelitis with fistulae (sulfur granules) in the setting of poor dental hygiene Pelvic abscesses in a women with intra-uterine device Fever, right lower quadrant mass and fistulae Suppurative pleuropulmonary infection with fistulae
Synonyms	Actinomyces, Aktinomykose, Lumpy jaw. ICD9: 039. ICD10: A42

Adenovirus infection

Agent	VIRUS - DNA. Adenoviridae, Adenovirus Enteric strains are classified in genus Mastadenovirus
Reservoir	Human, Non-human primates
Vector	None
Vehicle	Droplet, Water, Respiratory or pharyngeal acquisition
Incubation Period	4d - 12d
Diagnostic Tests	Viral culture/serology or antigen assay. Direct fluorescence of secretions. Nucleic acid amplification.
Typical Adult Therapy	Enteric/secretion precautions. Cidofovir has been used in some cases. Symptomatic therapy
Typical Pediatric Therapy	As for adult
Vaccine	Adenovirus vaccine
Clinical Hints	Generally, an uncomplicated illness lasting 3 to 5 days - Atypical pneumonia, upper respiratory infection, tracheitis, bronchiolitis - Keratoconjunctivitis with preauricular adenopathy - Gastroenteritis or hemorrhagic cystitis
Synonyms	Adenovirus gastroenteritis, Epidemic keratoconjunctivitis, Pharyngoconjunctival fever. ICD9: 047.9,077.1,077.2,008.62,480.0 ICD10: A08.2,B30.1,B34.0,J12.0

Adenovirus infection in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
1983	Antananarivo	children	18	Malagasy children ages 6 days to 10 years, hospitalized with viral acute respiratory infection ¹
1986*	Antananarivo	children	19	outpatient children with diarrhea (²
2008 - 2009	Antananarivo	patients	6.1	patients with influenza-like illness ³

* indicates publication year (not necessarily year of survey)

References

1. [Arch Inst Pasteur Madagascar 1986 ;52\(1\):147-55.](#)
2. [Arch Inst Pasteur Madagascar 1986 ;52\(1\):123-30.](#)
3. [PLoS One 2011 Mar 03;6\(3\):e17579.](#)

Aeromonas and marine Vibrio infx.

Agent	BACTERIUM. <i>Aeromonas hydrophila</i> , <i>Vibrio vulnificus</i> , et al Facultative gram-negative bacilli
Reservoir	Salt or brackish water, Fish
Vector	None
Vehicle	Water, Shellfish, Contact
Incubation Period	Range 2d - 7d
Diagnostic Tests	Culture. Notify laboratory if these organisms are suspected in stool.
Typical Adult Therapy	Fluoroquinolone or Sulfamethoxazole / Trimethoprim . Other antimicrobial agent as determined by susceptibility testing
Typical Pediatric Therapy	Sulfamethoxazole / Trimethoprim . Or other antimicrobial agent as determined by susceptibility testing
Clinical Hints	Diarrhea, fever, vomiting or sepsis following marine injury or ingestion of raw oysters / contaminated fresh or brackish water Fecal leukocytes present Severe or fatal in immunosuppressed or alcoholic patients
Synonyms	Aeromonas, Aeromonas hydrophila, Vibrio mimicus, Vibrio vulnificus. ICD9: 005.81,027.9 ICD10: A48.8

Amoeba - free living

Agent	PARASITE - Protozoa. Centramoebida, Acanthamoebidae: <i>Acanthamoeba</i> and <i>Balamuthia</i> Schizopyrenida, Vahlkampfidae: <i>Naegleria</i>
Reservoir	Water, Soil
Vector	None
Vehicle	Water (diving, swimming), Contact
Incubation Period	5d - 6d (range 2d - 14d) Granulomatous ? to 2m
Diagnostic Tests	Wet preparation. Specialized cultures. Serology available in reference centers.
Typical Adult Therapy	CNS <i>Naegleria</i> : Amphotericin B to 1 mg/kg/d IV + 1.5 mg intrathec. X 8 days; + Miconazole 350 mg/sq m/d IV + 10 mg intrathec. qod X 8d <i>Acanthamoeba</i> : Sulfonamides + Flucytosine Miltefosine some cases of <i>Acanthamoeba</i> / <i>Balamuthia</i>
Typical Pediatric Therapy	CNS <i>Naegleria</i> : Amphotericin B to 1 mg/kg/d IV + 1.5 mg intrathecal X 8 days; plus Miconazole 350 mg/sq m/d IV + 10 mg intrathecal qod X 8d <i>Acanthamoeba</i> : Sulfonamides + Flucytosine Miltefosine successful in some cases of <i>Acanth.</i> / <i>Balamuthia</i> enceph.
Clinical Hints	Severe, progressive meningoencephalitis (<i>Naegleria</i> , <i>Acanthamoeba</i> or <i>Balamuthia</i>) following swimming or diving in fresh water Keratitis (<i>Acanthamoeba</i>), associated with contaminated solutions used to clean contact lenses.
Synonyms	Acanthamoben, Acanthamoeba, Allovahlkampfia, Amebic keratitis, Balamuthia, Balmuthia, Dictyostelium, Free-living ameba, Leptomyxid ameba, Naegleria, Paravahlkampfia, Primary amebic meningoencephalitis, Sappinia, Vahlkampfia. ICD9: 136.2 ICD10: B60.1,B60.2

Amoeba - free living in Madagascar

The first case report of amebic meningoencephalitis in Madagascar was published in 2005 - fatal infection by *Naegleria fowleri*.¹

References

1. Bull Soc Pathol Exot 2005 Apr ;98(1):11-3.

Amoebiasis

Agent	PARASITE - Protozoa. Sarcomastigota, Entamoebidae: <i>Entamoeba histolytica</i> (must be distinguished from non-invasive, <i>Entamoeba dispar</i>)
Reservoir	Human
Vector	Fly (Musca) - occasionally
Vehicle	Food, Water, Sexual contact, Fly
Incubation Period	1w - 3w (range 3d - 90d)
Diagnostic Tests	Fresh stool/aspirate for microscopy. Stool antigen assay. Stool PCR. Note: serological tests usually negative.
Typical Adult Therapy	Metronidazole 750 mg PO TID X 10d Follow with: Paromomycin 500 mg PO TID X 7d OR Iodoquinol 650 mg PO TID X 20d
Typical Pediatric Therapy	Metronidazole 15 mg/kg TID X 10d Follow with: Paromomycin 10 mg/kg PO TID X 7d OR Iodoquinol 10 mg/kg PO TID X 20d
Clinical Hints	Dysentery, abdominal pain, tenesmus. Unlike shigellosis, hyperemia of the rectal mucosa and fecal pus are absent. Liver abscess and dysentery rarely coexist in a given patient.
Synonyms	Amebiasis, Amebiasis intestinal, Amebic colitis, Amebic dysentery, Amoebenruhr, Entamoeba bangladeshi, Entamoeba gingivalis, Entamoeba moshkovskii. ICD9: 006.0,006.1,006.2 ICD10: A06.0,A06.1,A06.2

Amoebic abscess

Agent	PARASITE - Protozoa. Sarcomastigota, Entamoebidae: <i>Entamoeba histolytica</i> (must be distinguished from non-invasive, <i>Entamoeba dispar</i>)
Reservoir	Human
Vector	Fly (Musca) - occasionally
Vehicle	Food, Water, Sexual contact, Fly
Incubation Period	2w - 6m (rarely years; 95% within 6m)
Diagnostic Tests	Imaging. Serology. Nucleic acid amplification. Note: Amoebae are usually not present in stool at this stage.
Typical Adult Therapy	Metronidazole 750 mg TID X 10d OR Tinidazole 800 mg TID X 5d
Typical Pediatric Therapy	Metronidazole 15 mg/kg TID X 10d OR Tinidazole 15 to 20 mg/kg TID X 5d
Clinical Hints	Fever, local pain and weight loss Concurrent amebic colitis is usually not present. Typically a single abscess in the right hepatic lobe (bacterial abscesses may be multiple)
Synonyms	Absceso amebiano, Amebic liver abscess. ICD9: 006.3,006.4,006.5,006.6,006.8 ICD10: A06.4,106.5,A06.7,106.8

Angiostrongyliasis

Agent	PARASITE - Nematoda. <i>Angiostrongylus (Parastromgylus) cantonensis</i>
Reservoir	Rat, Prawn, Frog
Vector	None
Vehicle	Snail, Slug, Prawn, Lettuce
Incubation Period	2w (range 5d - 35d)
Diagnostic Tests	Identification of parasite. Serological tests have limited reliability.
Typical Adult Therapy	Corticosteroids if severe cns disease Mebendazole 100 mg BID X 5d; OR Albendazole (20 mg/kg/day)
Typical Pediatric Therapy	Corticosteroids if severe cns disease. Mebendazole 100 mg BID X 5d (age >2); OR Albendazole (20 mg/kg/day)
Clinical Hints	Follows ingestion of slugs, snails, prawns or frogs. Eosinophilic meningitis or encephalitis - generally self-limited Fever is typically absent or low grade Cranial nerve involvement (II, VI, V and VII) is common
Synonyms	Alicata's disease, Angiostrongylose, Angiostrongylus cantonensis, Bundibugyo, Eosinophilic meningitis, Haemostromgylus ratti, Panstrongylasis, Parastromgylias, Parastromgylus cantonensis, Pulmonema cantonensis. ICD9: 128.8 ICD10: B83.2

Angiostrongyliasis in Madagascar

Angiostrongylus cantonensis was identified in rodents on Madagascar, ca. 1963. [1](#) [2](#) [3](#)

References

1. [J Parasitol 1965 Dec ;51\(6\):937.](#)
2. [Soc Sci Med 1992 Jan ;34\(2\):199-212.](#)
3. [Arch Inst Pasteur Madagascar 1982 ;50\(1\):35-8.](#)

Animal bite-associated infection

Agent	BACTERIUM. <i>Pasteurella multocida</i> , and other zoonotic bite pathogens
Reservoir	Cat, Dog, Marsupial, Other mammal, Rarely bird
Vector	None
Vehicle	Bite (cat in 60%, dog in 30%), No obvious source in 10%
Incubation Period	3h - 3d
Diagnostic Tests	Gram stain/culture. Hold specimen for 2 weeks to discount Capnocytophaga & other genera.
Typical Adult Therapy	Penicillin, a Tetracycline or Cefuroxime . Dosage and duration appropriate for nature and severity of infection
Typical Pediatric Therapy	Penicillin or Cefuroxime . Dosage and duration appropriate for nature and severity of infection
Clinical Hints	Infection of cat- dog- or other bite wound; however, as many as 10% do not recall the bite Symptoms appear within 3 to 72 hours Systemic infection (meninges, bone, lungs, joints, etc) may occur.
Synonyms	Bacteroides pyogenes, Bacteroides tectus, Bergeyella zoohelcum, Bisgaard's taxon 16, Capnocytophaga canimorsus, Capnocytophaga cynodegmi, CDC EF-4, CDC NO-1, Corynebacterium kutscheri, Corynebacterium canis, Corynebacterium freiburgense, Fusobacterium canifelinum, Halomonas venusta, Kingella potus, Moraxella canis, Mycobacterium vulneris, Neisseria animaloris, Neisseria canis, Neisseria weaveri, Neisseria zoodegmatis, Pasteurella caballi, Pasteurella canis, Pasteurella dagmatis, Pasteurella multocida, Pasteurella stomatis, Psychrobacter immobilis, Staphylococcus intermedius, Vibrio harveyi. ICD9: 027.2 ICD10: A28.0

Anisakiasis

Agent	PARASITE - Nematoda. Secernentea: <i>Anisakis simplex</i> and <i>Pseudoterranova decipiens</i>
Reservoir	Marine mammals Fish
Vector	None
Vehicle	Undercooked fish
Incubation Period	Hours - 14d
Diagnostic Tests	Endoscopic identification of larvae.
Typical Adult Therapy	Endoscopic removal of larvae; surgery for complications
Typical Pediatric Therapy	As for adult
Clinical Hints	Follows ingestion of undercooked fish (e.g., sushi), squid or octopus. May present as - a generalized allergic reaction, or - acute and chronic abdominal pain, often with "peritoneal signs" or hematemesis
Synonyms	Anasakis, Bolbosoma, Cod worm disease, Contracaecum, Eustrongylides, Herring worm disease, Hysterothylacium, Pseudoterranova, Whalworm. ICD9: 127.1 ICD10: B81.0

Anthrax

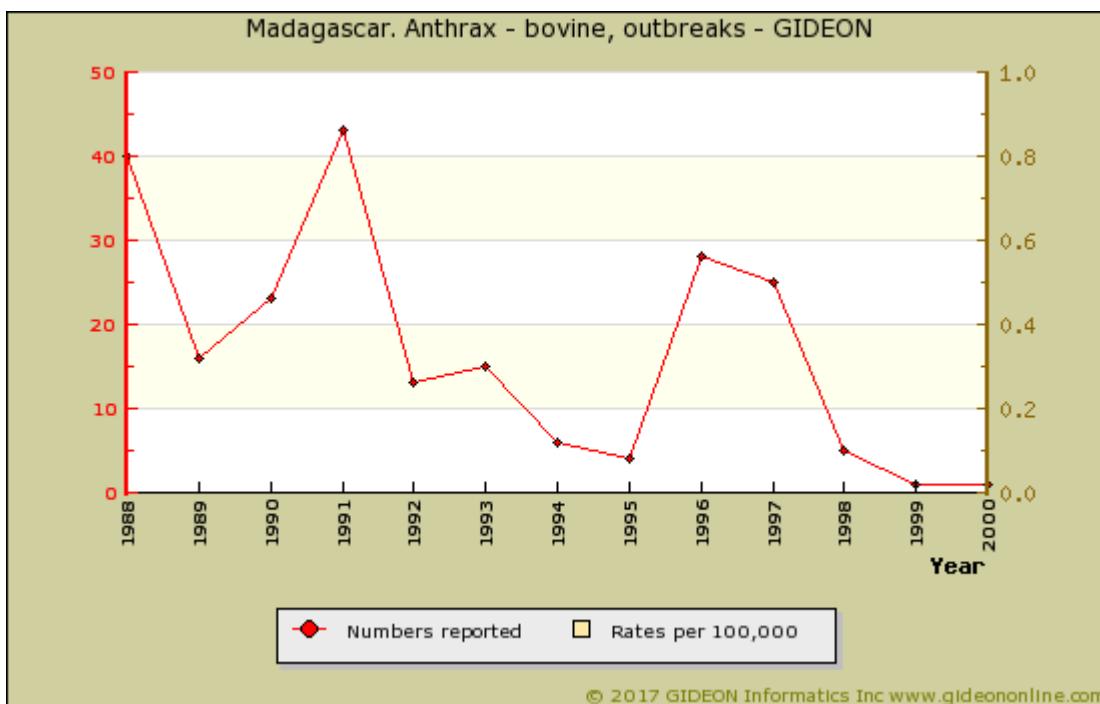
Agent	BACTERIUM. <i>Bacillus anthracis</i> An aerobic gram positive bacillus
Reservoir	Soil, Goat, Cattle, Sheep, Water, Horse
Vector	Fly (rare)
Vehicle	Hair, Wool, Hides, Bone products, Air, Meat, Contact, Respiratory or pharyngeal acquisition
Incubation Period	1d-7d; 1-12 cutaneous, 1-7 GI; 1-43 pulmonary
Diagnostic Tests	Bacteriological culture. Alert laboratory that organism may be present. Serology and rapid tests by Ref. Centers.
Typical Adult Therapy	Isolation (secretions). <i>Ciprofloxacin</i> (or Penicillin if susceptible). If systemic infection, add <i>Meropenem</i> (or <i>Imipenem</i>) + <i>Linezolid</i> (or <i>Rifampin</i> or <i>Clindamycin</i>) Dosage/route/duration as per severity If inhalational anthrax, add Raxibacumab
Typical Pediatric Therapy	As for adult
Vaccine	Anthrax vaccine
Clinical Hints	Acquired from contact with large mammals or their products (meat, wool, hides, bone). Anthrax may present at dermal, pulmonary, gastrointestinal or other forms depending of site of inoculation. - Edematous skin ulcer covered by black eschar - satellite vesicles may be present - Fulminant gastroenteritis or pneumonia - Necrotizing stomatitis - Hemorrhagic meningitis.
Synonyms	Antrace, Antrax, Antraz, Carbunco, Carbunculo, La fievre charbonneuse, Malcharbon, Malignant pustule, Miltbrann, Miltvuur, Milzbrand, Mjaltbrand, Siberian plague, Siberian ulcer, Splenic fever, Wool-sorter's disease. ICD9: 022 ICD10: A22

Anthrax in Madagascar

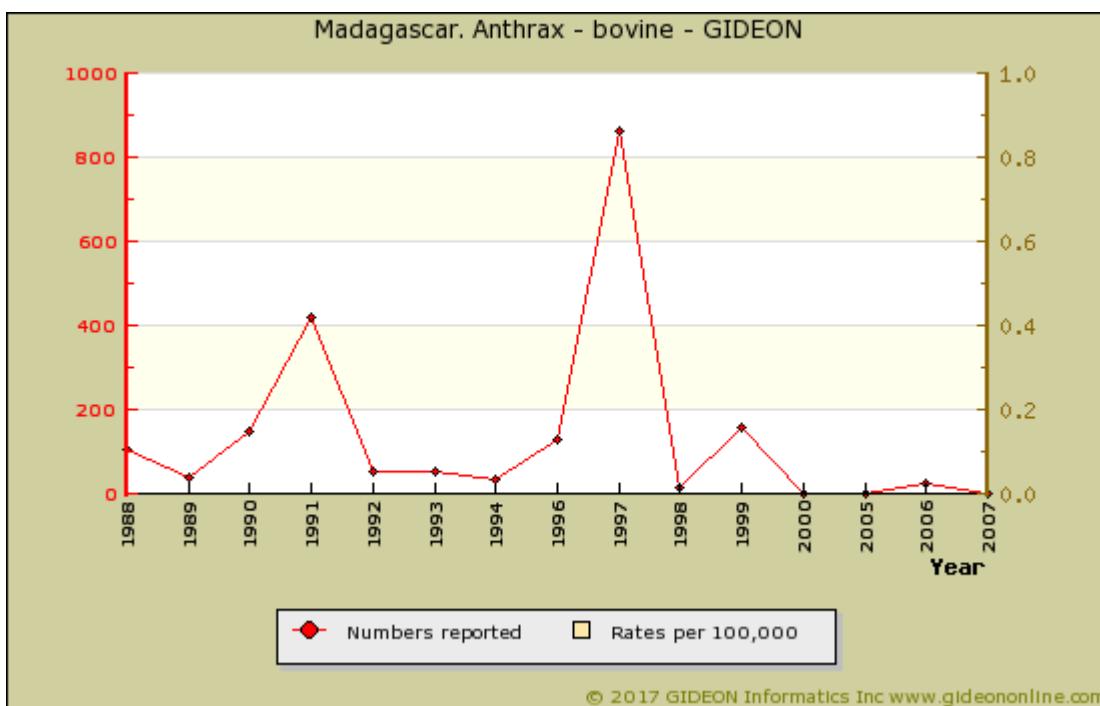
Anthrax, cases: None reported between 1997 and 1998

Notes:

1. The first case reports of anthrax in Madagascar were published in 1971. ¹



Graph: Madagascar. Anthrax - bovine, outbreaks



Graph: Madagascar. Anthrax - bovine

Outbreaks of ovine / caprine anthrax were reported each year during 1988 to 1996.

References

1. Rev Elev Med Vet Pays Trop 1971 ;24(1):19-21.

Ascariasis

Agent	PARASITE - Nematoda. Secernentea: <i>Ascaris lumbricoides</i>
Reservoir	Human, Dog
Vector	None
Vehicle	Vegetables, Fly
Incubation Period	10d - 14d (range 7d - >200d)
Diagnostic Tests	Stool microscopy.
Typical Adult Therapy	Albendazole 400 mg X 1 dose OR Mebendazole 100 mg BID X 3d
Typical Pediatric Therapy	Albendazole 200 mg PO single dose OR Mebendazole 100 mg BID X 3 d (> age 2).
Clinical Hints	Highest rates among children and in areas of crowding and poor sanitation Acute illness characterized by cough, wheezing and eosinophilia Adult worms are associated with abdominal pain (occasionally obstruction), pancreatic or biliary disease Passage of a roundworm longer than 5 cm is virtually pathognomonic
Synonyms	Ascaris, <i>Ascaris lumbricoides</i> , Askariasis. ICD9: 127.0 ICD10: B77

Ascariasis in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
1998*	Southeastern Region	children	93	93% of children in the southeastern region 1
1981*	Eastern Region	general population	61.3	2

* indicates publication year (not necessarily year of survey)

Over 50% of the population of Mahajanga region, west coast are seropositive toward *Ascaris lumbricoides*. [3](#)

References

1. [J Parasitol 1998 Jun ;84\(3\):480-4.](#)
2. [Arch Inst Pasteur Madagascar 1981 ;48\(1\):151-61.](#)
3. [Bull Soc Pathol Exot 2003 Mar ;96\(1\):41-5.](#)

Aspergillosis

Agent	FUNGUS. Ascomycota, Euascomycetes, Eurotiales: <i>Aspergillus</i> . A hyaline hyphomycete
Reservoir	Compost, Hay, Cereal, Soil
Vector	None
Vehicle	Air, Respiratory or pharyngeal acquisition
Incubation Period	3d - 21d
Diagnostic Tests	Fungal culture. Biopsy. Nasal culture or serologic testing may be useful in select cases.
Typical Adult Therapy	Voriconazole 6 mg/kg IV Q12h, day 1; follow with 4 mg/kg IV OR Amphotericin B - if invasive, rapidly increase to max dose 0.6 mg/kg/d and to total 2.5g. OR Itraconazole
Typical Pediatric Therapy	Voriconazole 3 to 9 mg/kg IV Q12h OR Amphotericin B - if invasive, rapidly increase to max dose 0.6 mg/kg/d X 6w. OR Itraconazole
Clinical Hints	Pulmonary "fungus ball" or adult-onset asthma Pulmonary consolidation or infected "pulmonary infarct" in the setting of immune suppression (e.g., AIDS, leukemia, etc) May progress to widespread hematogenous dissemination if not treated promptly.
Synonyms	Aspergillose, Aspergillus. ICD9: 117.3 ICD10: B44

Bacillary angiomatosis

Agent	BACTERIUM. <i>Bartonella henselae</i> or <i>Bartonella quintana</i> . Rickettsia-like bacteria
Reservoir	Human, Tick, Cat
Vector	Cat flea, Tick (Ixodid)
Vehicle	None
Incubation Period	Unknown
Diagnostic Tests	Histology with special stains. Specialized culture techniques. Serology. Nucleic acid amplification.
Typical Adult Therapy	Clarithromycin 500 mg BID X 3 months Alternatives Azithromycin 250 mg QD Ciprofloxacin 500 mg BID OR Doxycycline 100 mg BID Erythromycin 500 mg po QID
Typical Pediatric Therapy	Clarithromycin 7.5 mg/kg PO BID X 8 months. OR Gentamicin 2 mg/kg IMq12h
Clinical Hints	Hemangiomatous papules and nodules of skin, spleen, liver (peliosis hepatitis), bone or other tissues Virtually all cases occur in the setting of AIDS or other immune deficiency Rare instances are reported following tick bite in immune-competent individuals.
Synonyms	Bacillary peliosis, Peliosis hepatitis. ICD9: 757.32,083.8 ICD10: K76.4,A44.0

Bacillus cereus food poisoning

Agent	BACTERIUM. <i>Bacillus cereus</i> (toxin). An aerobic gram-positive bacillus
Reservoir	Soil, Processed & dried foods
Vector	None
Vehicle	Food
Incubation Period	2h - 9h (range 1h - 24h)
Diagnostic Tests	No practical test available. Isolation of organism from suspect food.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Usually follows ingestion of rice or other vegetables Vomiting within 1 to 6 hours and/or diarrhea within 6 to 24 hours Fecal leukocytes are not seen
Synonyms	Bacillus cytotoxicus. ICD9: 005.89 ICD10: A05.4

Bacterial vaginosis

Agent	BACTERIUM. <i>Gardnerella vaginalis</i> (facultative gram-negative bacillus), <i>Mobiluncus curtisi</i> , <i>Mobiluncus mulieris</i> , <i>Prevotella</i> , et al
Reservoir	Human
Vector	None
Vehicle	Sexual contact, Normal flora in 14% (girls) to 70% (women)
Incubation Period	Unknown
Diagnostic Tests	Identification of "clue cells" or positive KOH test in vaginal discharge. Culture.
Typical Adult Therapy	Metronidazole 500 mg BID X 7d OR Tinidazole 2 g PO daily X 3d OR Clindamycin 300 mg BID X 7d + intravaginal Clindamycin or Metronidazole ? Also treat sexual partner
Typical Pediatric Therapy	Metronidazole 7.5 mg/kg BID X 7d
Clinical Hints	Thin vaginal discharge - "fishy" odor when mixed with KOH Mild to moderate pruritis Urethritis may be present in sexual partner.
Synonyms	Gardnerella, Gardnerella vaginalis, Mobiluncus. ICD9: 041.89,616,10,099.8 ICD10: N76.1

Bacterial vaginosis in Madagascar

Prevalence surveys

Years	Study Group	%
2001 - 2002	sex workers	56

References

1. [Trop Med Int Health 2009 Apr ;14\(4\):480-6.](#)

Balantidiasis

Agent	PARASITE - Protozoa. Ciliate (Ciliophora), Litostomatea: <i>Balantidium coli</i>
Reservoir	Pig, Non-human primate, Rodent
Vector	None
Vehicle	Water, Food
Incubation Period	1d - 7d (range 1d - 60d)
Diagnostic Tests	Microscopy of stool or colonic aspirates.
Typical Adult Therapy	Tetracycline 500 mg QID X 10d. OR Metronidazole 750 mg TID X 5d. OR Iodoquinol 650 mg TID X 20d
Typical Pediatric Therapy	Age >= 8 years: Tetracycline 10 mg/kg QID (max 2g/d) X 10d. Age <8 yrs, Metronidazole 15 mg/kg TID X 5d; or Iodoquinol 13 mg/kg TID X 20d
Clinical Hints	The disease is most common in pig-raising areas Dysentery, often with vomiting Mimics intestinal amebiasis Symptoms may persist for one to four weeks, and may recur.
Synonyms	Balantidiose, Balantidiosis, <i>Balantidium coli</i> , Balantidosis, Balindosis, Ciliary dysentery. ICD9: 007.0 ICD10: A07.0

Balantidiasis in Madagascar

Balantidium coli has been identified in wild lemur populations. [1](#) [2](#)

References

1. Am J Primatol 2008 Feb ;70(2):175-84.
2. J Parasitol 2010 Apr ;96(2):245-51.

Bartonellosis - cat borne

Agent	BACTERIUM. <i>Afipia felis</i> , <i>Bartonella henselae</i> , <i>Bartonella clarridgeiae</i> , <i>Bartonella grahamii</i> , et al. A facultative gram-negative coccobacillus
Reservoir	Cat, Possibly tick
Vector	Cat flea (<i>Ctenocephalides</i>)
Vehicle	Cat scratch, Plant matter (thorn, etc)
Incubation Period	3d - 14d
Diagnostic Tests	Visualization of organisms on Warthin Starry stain. Culture. Serology. Nucleic acid amplification.
Typical Adult Therapy	Aspiration of nodes as necessary. Azithromycin 500 mg day 1, then 250 daily X 4 days Alternatives: Clarithromycin , Ciprofloxacin , Sulfamethoxazole(trimethoprim
Typical Pediatric Therapy	Aspiration of nodes as necessary. Azithromycin 10 mg/kg day 1, then 5 mg/kg daily X 4 days
Clinical Hints	Tender suppurative regional adenopathy following a cat scratch (usually kitten) Fever present in 25% Systemic infection (liver, brain, endocardium, bone, etc) occasionally encountered Most cases resolve within 6 weeks.
Synonyms	<i>Afipia felis</i> , <i>Bartonella clarridgeiae</i> , <i>Bartonella grahamii</i> , <i>Bartonella henselae</i> , <i>Bartonella koehlerae</i> , Cat scratch disease, Debre's syndrome, Foshay-Mollaret cat-scratch fever, Katszenkratz-Krankheit, Petzetakis' syndrome, SENLAT. ICD9: 078.3 ICD10: A28.1

Bartonellosis - other systemic

Agent	BACTERIUM. <i>Bartonella quintana</i> , <i>B. koehlerae</i> , <i>B. elizabethae</i> , <i>B. tamiae</i> , <i>B. washoensis</i> , etc A fastidious gram-negative coccobacillus
Reservoir	Human, Louse, Rat Cat Dog Sheep
Vector	Louse (<i>Pediculus</i>) Flea (<i>Ctenocephalides</i> , <i>Pulex</i>), Mite (<i>Dermanyssus</i>)
Vehicle	Wound or eye contact with secretions/louse feces
Incubation Period	9d - 25d (range 4d - 35d)
Diagnostic Tests	Serology. Culture. Nucleic acid amplification.
Typical Adult Therapy	Doxycycline 100 mg PO BID X 3 to 5 days (if endocarditis, add Gentamicin 3 mg/kg daily X 28 days) Alternatives: Clarithromycin , Azithromycin , Gentamicin , Fluoroquinolone (Levofloxacin , Trovaflloxacin , Pefloxacin , Sparfloxacin or Moxifloxacin)
Typical Pediatric Therapy	Erythromycin 10 mg/kg PO QID X 3 to 5 days. OR Gentamicin 2 mg/kg IM q12h. Alternatives: Clarithromycin , Azithromycin
Clinical Hints	Often associated with poor hygiene and crowding Headache, myalgias, shin pain, macular rash and splenomegaly Endocarditis and bacteremia in some cases Relapse is common
Synonyms	<i>Bartonella alsatica</i> , <i>Bartonella bovis</i> , <i>Bartonella capreoli</i> , <i>Bartonella doshiae</i> , <i>Bartonella elizabethae</i> , <i>Bartonella melophagi</i> , <i>Bartonella quintana</i> , <i>Bartonella rochalimae</i> , <i>Bartonella schoenbuchensis</i> , <i>Bartonella tamiae</i> , <i>Bartonella tribocorum</i> , <i>Bartonella vinsonii</i> , <i>Bartonella vinsonii berkhoffii</i> , <i>Bartonella volans</i> , <i>Bartonella washoensis</i> , <i>Candidatus Bartonella mayotimonensis</i> , <i>Candidatus Bartonella merieuxii</i> , <i>Candidatus Bartonella rochalimae</i> , Five day fever, His-Werner disease, Meuse fever, Quintan fever, Quintana fever, Shank fever, Shin fever, Shinbone fever, Trench fever, Volhynian fever. ICD9: 083.1 ICD10: A44.0,A44.8,A79.0

Bertiella and Inermicapsifer

Agent	PARASITE - Platyhelminthes, Cestoda. Cyclophyllidea, Anoplocephalidae: <i>Bertiella</i> spp. and <i>Inermicapsifer</i> spp.
Reservoir	Rodent, Non-human primate
Vector	None
Vehicle	Mite (ingestion)
Incubation Period	Unknown
Diagnostic Tests	Identification of ova or proglottids in stool.
Typical Adult Therapy	Not established
Typical Pediatric Therapy	As for adult
Clinical Hints	Abdominal pain, vomiting, diarrhea or constipation following contact with primates.
Synonyms	Bertiella, Bertiella, Bertiella mucronata, Bertiella studeri, Bertielliasis, Inermicapsifer. ICD9: 123.8 ICD10: B71.8

Bertiella and Inermicapsifer in Madagascar

A related parasite, *Inermicapsifer madagascariensis* has been reported to cause intestinal infection in Madagascar.

Blastocystis hominis infection

Agent	PARASITE - Protozoa. Chromista, Bigyra, Blastocystea: <i>Blastocystis hominis</i> . (taxonomic status remains uncertain)
Reservoir	Human
Vector	None
Vehicle	Fecal-oral, Water
Incubation Period	Unknown
Diagnostic Tests	Stool microscopy. Nucleic acid amplification.
Typical Adult Therapy	Nitazoxanide 500 mg BID X 3 d. OR Metronidazole 750 mg TID X 10d. OR Iodoquinol 650 mg TID X 20 d. OR Sulfamethoxazole / Trimethoprim
Typical Pediatric Therapy	Nitazoxanide - Age 1 to 3 years: 5 ml (100 mg) PO Q12h X 3 days - Age 4 to 11 years: 10 mg (200 mg) PO Q12h X 3 days; OR Metronidazole 15 mg/kg/d X 10d. Sulfamethoxazole / Trimethoprim
Clinical Hints	The precise role of this organism in disease is controversial Diarrhea and flatulence, usually without fever The illness is similar to giardiasis Increased risk among immune-suppressed patients;
Synonyms	Apoi, Blastocystiose, <i>Blastocystis hominis</i> , Zierdt-Garavelli disease. ICD9: 007.8 ICD10: A07.8

Blastomycosis

Agent	FUNGUS. Ascomycota, Euascomycetes, Onygenales. <i>Blastomyces dermatitidis</i> . A dimorphic fungus
Reservoir	Soil, Beaver, Dog, Rodent
Vector	None
Vehicle	Air, Respiratory or pharyngeal acquisition
Incubation Period	14d - 44d (range 7d - 100d)
Diagnostic Tests	Microscopy and culture. Skin tests and serology not useful. Nucleic acid amplification.
Typical Adult Therapy	Itraconazole 200 to 400 mg PO daily X 6 months. OR Ketoconazole 400 mg/d X 6 months. OR Amphotericin B - total dose 2.0g. Excision as required
Typical Pediatric Therapy	Ketoconazole (if age >2) 5 mg/kg/d X 6 months. OR Amphotericin B - total cumulative dose 30 mg/kg
Clinical Hints	Acute or chronic lung infection Often associated with hematogenous involvement of skin (verrucous or ulcerated skin/subcutaneous lesions) Osteomyelitis of vertebrae or long bones, meningitis, prostatitis, etc.
Synonyms	<i>Blastomyces dermatitidis</i> , <i>Blastomyces gilchristii</i> , Blastomykose, Chicago disease, Gilchrist's disease, North American blastomycosis. ICD9: 116.0 ICD10: B40

Borna virus encephalitis

Agent	VIRUS - RNA Mononegavirales Bornavirus
Reservoir	Squirrel, Horse, Sheep
Vector	None
Vehicle	Unknown
Incubation Period	Unknown
Diagnostic Tests	Metagenomic analysis of brain tissue and cerebrospinal fluid Culture on specialized cell lines Serology
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	May follow animal (horse, squirrel) contact Borna virus infection is generally subclinical Manifested in some cases by mood disorders or possibly schizophrenia Overt and fatal encephalitis has been reported, with fever, gait disturbance and ocular palsies
Synonyms	Borna disease, Heated head disease, Sad horse disease, Staggering disease of cats, Variegated squirrel 1 bornavirus, VSBV-1. ICD9: 323.9 ICD10: A83.9

Botulism

Agent	BACTERIUM. <i>Clostridium botulinum</i> . An anaerobic gram-positive bacillus
Reservoir	Soil, Animal, Fish
Vector	None
Vehicle	Food, Soil (contamination of wound or injected drug)
Incubation Period	1d - 2d
Diagnostic Tests	Electrophysiologic (EMG) pattern. Isolation of organism from food (occ. from infant stomach). Mouse toxin assay
Typical Adult Therapy	Heptavalent (types A-G) or trivalent (types A, B, E) antitoxin (following test dose) 10 ml in 100 ml saline over 30 min Additional 10 ml at 2 and 4 hours if necessary. Respiratory support
Typical Pediatric Therapy	As for adult
Vaccine	Botulism antitoxin
Clinical Hints	Clinical manifestations similar to those of atropine poisoning: dysarthria, diplopia, dilated pupils, dry mouth, constipation, flaccid paralysis, etc Onset approximately 36 hrs after ingestion of poorly-preserved food Botulism may follow contaminated injection (ie, illicit drug) or other wound Infant botulism associated with infant formula containing honey contaminated by bacterial spores
Synonyms	Botulisme, Botulismo, Botulismus, Kerner's disease. ICD9: 005.1 ICD10: A05.1

Botulism in Madagascar

The first report of human botulism in Madagascar was published in 1986. ¹

References

1. [Arch Inst Pasteur Madagascar 1986 ;52\(1\):11-21.](#)

Brain abscess

Agent	BACTERIUM OR FUNGUS. Mixed oral anaerobes / streptococci, <i>Staphylococcus aureus</i> (from endocarditis), etc.
Reservoir	Human
Vector	None
Vehicle	None
Incubation Period	Variable
Diagnostic Tests	Imaging techniques (CT, scan, etc).
Typical Adult Therapy	Antibiotic(s) appropriate to likely pathogens + drainage Typical empiric therapy: Intravenous Ceftriaxone 2 gm + Metronidazole 15 mg/kg, Q12h
Typical Pediatric Therapy	Typical empiric therapy: Intravenous Ceftriaxone 50 mg/kg + Metronidazole 15 mg/kg IV, Q12h
Clinical Hints	Headache, vomiting and focal neurological signs Often associated with chronic sinusitis or otitis media, pleural or heart valve infection Patients are often afebrile.
Synonyms	Ascesso cerebrale, Cerebral abscess. ICD9: 324.0 ICD10: G06.0

Brucellosis

Agent	BACTERIUM. <i>Brucella abortus</i> , <i>Brucella melitensis</i> , <i>Brucella suis</i> , <i>Brucella canis</i> An aerobic gram-negative bacillus
Reservoir	Pig, Cattle, Sheep, Goat, Dog, Coyote, Caribou
Vector	None
Vehicle	Food, Air, Dairy products, Animal excretions, Breastfeeding
Incubation Period	10d - 14d (range 5d - 60d)
Diagnostic Tests	Culture of blood or bone marrow. Serology. Note: Alert laboratory to possibility of Brucella.
Typical Adult Therapy	Doxycycline 100 mg BID + Rifampin 600 mg BID X 6 weeks. Alternatives Tetracycline + Gentamicin
Typical Pediatric Therapy	Rifampin 20 mg/kg/day (maximum 600 mg) plus: >age 8 years: Doxycycline 2 mg/kg BID PO X 6w age < 8 years Sulfamethoxazole/trimethoprim 4/20 mg/kg BID X 4 to 6w Add Gentamicin if severe
Clinical Hints	Prolonged fever, hepatosplenomegaly, lymphadenopathy, arthritis, osteomyelitis or chronic multisystem infection Follows ingestion of unpasteurized dairy products, contact with farm animals or meat processing
Synonyms	Bang's disease, Bangsche Krankheit, Brucella, Brucellemia, Brucelliasis, Brucellose, Brucellosen, Brucellosi, Brucelose, Brucellosis, Cyprus fever, Febris melitensis, Febris sudoralis, Febris undulans, Fievre caprine, Gibraltar fever, Goat fever, Malta fever, Maltafieber, Melitococciosis, Neapolitan fever, Rock fever, Typhomalarial fever, Undulant fever. ICD9: 023 ICD10: A23

Brucellosis in Madagascar

No cases were reported in 1997.

Bunyaviridae infections - misc.

Agent	VIRUS - RNA. Bunyaviridae, Orthobunyavirus. Over 30 strains have been associated with human disease (see Synonyms)
Reservoir	Rat, Bird, Marsupial, Chipmunk, Cattle, Sheep, Horse, Bat
Vector	Mosquito (exceptions: Shuni is transmitted by culicoid flies; Bhanja, Tamdy, Wanowrie and Zirqa by ticks)
Vehicle	None
Incubation Period	3d - 12d
Diagnostic Tests	Serology and virus isolation. Nucleic acid amplification. Biosafety level 2 or 3.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Abrupt onset of fever, chills, headache; photophobia, rash arthralgia or myalgia Vomiting, diarrhea or cough may be present Meningitis or myocarditis may occur with Bwamba virus Illness resolves within two-to-seven days
Synonyms	Avalon, Bangui, Batai, Bhanja, Bunyamwera, Bwamba, Cache Valley, Calovo, Catu, Fort Sherman, Garissa, Germiston, Guama, Hartland virus, Ilesha, Ingwavuma, Issyk-Kul, Kairi, Lumbo, Ngari, Northway, Nyando, Pongola, Shokwe, Shuni, Tacaima, Tamdy, Tataguine, Tensaw, Wanowrie, Wyeomyia, Zirqa. ICD9: 066.3 ICD10: A93.8

Bunyaviridae infections - misc. in Madagascar

Ilesha virus (vectors, *Anopheles gambiae* and *Mansonia uniformis*) is associated with hemorrhagic fever in this country. ¹

Ngari virus has been recovered from mosquitoes (*Anopheles mascarensis*) in Madagascar. ^{2 3}

Bunyamwera virus has been recovered from *Aedes albopictus* and *Culex pipiens*.

References

1. Trans R Soc Trop Med Hyg 1994 Mar-Apr;88(2):205.
2. Dent Labor (Munch) 1978 Jan ;26(1):39-44.
3. Arch Inst Pasteur Madagascar 1989 ;55(1):7-317.

Campylobacteriosis

Agent	BACTERIUM. <i>Campylobacter jejuni</i> subsp <i>jejuni</i> , et al A microaerophilic gram-negative bacillus
Reservoir	Human, Mammal, Bird
Vector	None
Vehicle	Water, Food
Incubation Period	2d - 4d (range 1d - 10d)
Diagnostic Tests	Stool (rarely blood, CSF) culture. Nucleic acid amplification. Alert laboratory when these organisms are suspected.
Typical Adult Therapy	Stool precautions. Azithromycin 500 mg QD X 3 days Alternatives Erythromycin , Fluoroquinolone (Ciprofloxacin , Levofloxacin , Trovafloxacin , Pefloxacin , Sparfloxacin or Moxifloxacin), Gentamicin
Typical Pediatric Therapy	Stool precautions. Azithromycin 10 mg/kg QD X 3 days Alternatives - Erythromycin , Gentamicin
Clinical Hints	Febrile diarrhea or dysentery Vomiting or bloody stool often noted Severe abdominal pain may mimic appendicitis Disease is most common among children and lasts for one-to-four days
Synonyms	Campylobacter. ICD9: 008.43 ICD10: A04.5

Campylobacteriosis in Madagascar

43.3% of children below age 24 months experienced episodes of campylobacteriosis over a period of two years (Moramanga, 2010 to 2012). ¹

Prevalence surveys

Years	Region	Study Group	%	Notes
1988 - 1989		children	10.3	10.3% of children ages 0 to 14 years with diarrhea ²
2012*		children	9.7	9.7% of children with acute diarrhea (14 districts) ³
2015*	Antananarivo	pork	0	0% of street restaurants and ready-to-eat street-vended pork dishes ⁴

* indicates publication year (not necessarily year of survey)

References

- 1. [BMC Infect Dis 2014 ;14:372.](#)
- 2. [Arch Inst Pasteur Madagascar 1990 ;57\(1\):223-54.](#)
- 3. [PLoS One 2012 ;7\(9\):e44533.](#)
- 4. [Foodborne Pathog Dis 2015 Mar ;12\(3\):197-202.](#)

Candidiasis

Agent	FUNGUS - Yeast. Ascomycota, Hemiascomycetes, Saccharomycetales. <i>Candida albicans</i> , and other species.
Reservoir	Human
Vector	None
Vehicle	Contact, Catheter
Incubation Period	Variable
Diagnostic Tests	Culture. Serology and assays for cell-specific antigens are performed in some centers,
Typical Adult Therapy	Topical, oral, systemic antifungal agent depending on clinical presentation and species (in Drugs module, scroll through upper left box)
Typical Pediatric Therapy	As for adult
Clinical Hints	Dermal erythema with satellite pustules "Cheesy" mucosal discharge Candidemia in the setting of intravenous catheter or endocarditis Severe, widespread or intractable disease should suggest the possibility of underlying diabetes, AIDS or other form of immune suppression.
Synonyms	Candida, Candida-Mykosen, Candidiase, Candidiasi, Candidose, Monilia, Moniliasis, Salmonella, Thrush. ICD9: 112 ICD10: B37

Chancroid

Agent	BACTERIUM. <i>Haemophilus ducreyi</i> . A facultative gram-negative bacillus
Reservoir	Human
Vector	None
Vehicle	Sexual contact
Incubation Period	3d - 10d (2d - 21d)
Diagnostic Tests	Culture (inform laboratory when this diagnosis is suspected). Fluorescent staining under development
Typical Adult Therapy	Azithromycin 1.0 g PO X 1 dose. OR Ceftriaxone 250 mg IM X 1 dose. OR Ciprofloxacin 500 mg PO BID X 3 days OR Erythromycin 500 mg PO TID X 7d.
Typical Pediatric Therapy	Azithromycin 12 mg/kg PO X 1 dose OR Erythromycin 10 mg/kg PO TID X 7d. OR Ceftriaxone 10 mg/kg IM X 1
Clinical Hints	Soft, painful and tender chancre on erythematous base Regional lymphadenopathy - generally unilateral and painful Onset three-to-ten days following sexual exposure
Synonyms	Blot sjanker, Chancre mou, Chancro blando, <i>Haemophilus ducreyi</i> , Nkumunye, Soft chancre, Ulcera mole, Ulcus molle, Weeke sjanker, Weicher Schanker. ICD9: 099.0 ICD10: A57

Chancroid in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
1994*	Antananarivo	patients - STD	16	16% of genital ulcers treated in venereal disease clinics ¹
1999*	Antananarivo	patients - STD	33	33% of genital ulcers treated in venereal disease clinics ²

* indicates publication year (not necessarily year of survey)

References

1. *Sex Transm Dis* 1994 Nov-Dec;21(6):315-20.
2. *J Infect Dis* 1999 Oct ;180(4):1382-5.

Chikungunya

Agent	VIRUS - RNA. Togaviridae, Alphavirus: Chikungunya virus. Related Semliki Forest and Me Tri viruses are found in Africa & Asia
Reservoir	Non-human primate
Vector	Mosquito (<i>Aedes</i> spp.; <i>Ae. furcifer-taylori</i> group in Africa)
Vehicle	None
Incubation Period	2d - 12d
Diagnostic Tests	Viral culture (blood). Serology. Nucleic acid amplification. Biosafety level 3.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Abrupt onset of fever, leukopenia, myalgia and prominent bilateral joint pain A maculopapular rash appears on 2nd to 5th days in greater than 50% of cases Fever resolves within 7 days, but joint pain may persist for months
Synonyms	Buggy Creek, Getah, Kidenga pepo, Knuckle fever, Me Tri, Semliki Forest. ICD9: 062.8,066.3 ICD10: A92.1

Chikungunya in Madagascar

Cases of Chikungunya were reported in 2006. ¹

Exported cases:

2006 - Cases were reported among Belgians returning from Madagascar. ²

2007 - Cases were reported among French nationals returning from Madagascar. ^{3 4}

2009 - Cases were reported in Toamasina - and in a tourist returning from Madagascar to France. ⁵

Seroprevalence surveys

Notable outbreaks

Years	Cases	Notes
2010	2,680	2,680 cases to March ^{6 7 8}

Years	Study Group	%	Notes
2009	pregnant women	23-45	23% and 45% of pregnant women in two eastern coastal towns, following an outbreak of fever and joint pain ⁹

References

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- 2. ProMED <promedmail.org> archive: 20060426.1214
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- 5. ProMED <promedmail.org> archive: 20090611.2156
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Chlamydia infections, misc.

Agent	BACTERIUM. Chlamydiaceae, Chlamydiae , <i>Chlamydia trachomatis</i> ; <i>Simkania negevensis</i> ; <i>Waddlia chondrophila</i>
Reservoir	Human
Vector	None
Vehicle	Sexual contact
Incubation Period	5d - 10d
Diagnostic Tests	Microscopy and immunomicroscopy of secretions. Serology. Tissue culture. Nucleic acid amplification.
Typical Adult Therapy	Doxycycline 100 mg BID X 7d. OR Azithromycin 1g as single dose OR Levofloxacin 500 mg daily X 7 days OR Ofloxacin 300 mg BID X 7 days
Typical Pediatric Therapy	Weight <45 kg: Erythromycin 12.5 mg/kg QID X 14d Weight >=45 kg, but age <8 years: Azithromycin 1 g as single dose Age >= 8 years: Azithromycin 1 g as single dose OR Doxycycline 100 mg BID X 7 d
Clinical Hints	Thin, scant penile discharge Cervicitis, with overt pelvic inflammatory disease in some cases Conjunctivitis or neonatal pneumonia Concurrent gonorrhea may be present.
Synonyms	Bedsonia, Chlamydia suis, Chlamydia trachomatis, Chlamydien-Urethritis, Chlamydien-Zervizitis, Chlamydophila, Inclusion blenorhoea, Non-gonococcal urethritis, Nonspecific urethritis, Parachlamydia, Parachlamydia acanthamoebiae, Prachlamydia, Protochlamydia, Protochlamydia naegleriophila, Rhabdochlamydia, Simkania negevensis, Waddlia chondrophila. ICD9: 099.41,099.5 ICD10: A56,A55

Chlamydia infections, misc. in Madagascar

Prevalence surveys

Years	Study Group	%
2009*	sex workers	12

* indicates publication year (not necessarily year of survey)

References

1. [Med Mal Infect 2009 Dec ;39\(12\):909-13.](#)

Chlamydophila pneumoniae infection

Agent	BACTERIUM. Chlamydiaceae, Chlamydiae , <i>Chlamydophila (Chlamydia) pneumoniae</i>
Reservoir	Human
Vector	None
Vehicle	Droplet, Respiratory or pharyngeal acquisition
Incubation Period	7d - 28d
Diagnostic Tests	Direct fluorescence of sputum. Serology and culture in specialized laboratories. Nucleic acid amplification.
Typical Adult Therapy	Respiratory isolation. Azithromycin 500 mg day 1, then 0.25 g daily X 4 days OR Levofloxacin 750 mg po BID X 7d. OR Alternatives: Doxycycline 100 mg BID X 7d. Erythromycin 500 mg QID X 10d. Clarithromycin 0.5 g BID X 7d
Typical Pediatric Therapy	Respiratory isolation Azithromycin 10 mg/kg PO day 1; 5 mg/kg PO days 2 to 5
Clinical Hints	Atypical pneumonia, often associated with pharyngitis and myalgia Consider this diagnosis when Mycoplasma, Legionella and influenza are discounted.
Synonyms	Chlamydia pneumoniae, Chlamydia TWAR, Chlamydophila pneumoniae, TWAR. ICD9: 078.88 ICD10: J16.0

Cholecystitis and cholangitis

Agent	BACTERIUM. <i>Escherichia coli</i> , <i>Klebsiella pneumoniae</i> , enterococci, et al.
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Roentgenograms/imaging (cholecystogram, ultrasound, CT, etc).
Typical Adult Therapy	Antibiotics and surgical intervention as required
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, chills and right upper quadrant abdominal pain; Often "female, fat and forty" May be associated with gallstones or pancreatitis, or present as "fever of unknown origin"
Synonyms	Acute cholecystitis, Angiocholite, Ascending cholangitis, Cholangitis, Cholecystite, Cholecytis, Cholezystitis, Colangite, Colangitis, Colecistite, Gall bladder. ICD9: 575.0,576.1 ICD10: K81,K83.0

Cholera

Agent	BACTERIUM. <i>Vibrio cholerae</i> A facultative gram-negative bacillus
Reservoir	Human
Vector	None
Vehicle	Water, Fecal-oral, Seafood (oyster, ceviche), Vegetables, Fly
Incubation Period	1d - 5d (range 9h - 6d)
Diagnostic Tests	Stool culture. Advise laboratory when this organism is suspected.
Typical Adult Therapy	Stool precautions. Doxycycline 100 mg BID X 5d, or Fluoroquinolone (Levofloxacin , Trovafloxacin , Pefloxacin , Sparfloxacin or Moxifloxacin), or Azithromycin Fluids (g/l): NaCl 3.5, NaHCO ₃ 2.5, KCl 1.5, glucose 20
Typical Pediatric Therapy	Stool precautions. Age >=8 years: Doxycycline 2 mg/kg BID X 5d. Age <8 years: Sulfamethoxazole / Trimethoprim Fluids (g/l): NaCl 3.5, NaHCO ₃ 2.5, KCl 1.5, glucose 20
Vaccines	Cholera - injectable vaccine Cholera - oral vaccine
Clinical Hints	Massive, painless diarrhea and dehydration Occasionally vomiting Apathy or altered consciousness are common Rapid progression to acidosis, electrolyte imbalance and shock Fever is uncommon.
Synonyms	Colera, Kolera. ICD9: 001 ICD10: A00

Cholera in Madagascar

Cholera is currently or recently endemic to:

Antananarivo Province:

- Ambohidratrimo District
- Atsimondrano District
- Avaradrano District
- Renivohitra District

Antsiranana Province:

- Ambanja District
- Ambilobe District
- Antsiranana II District
- Nosy Be District

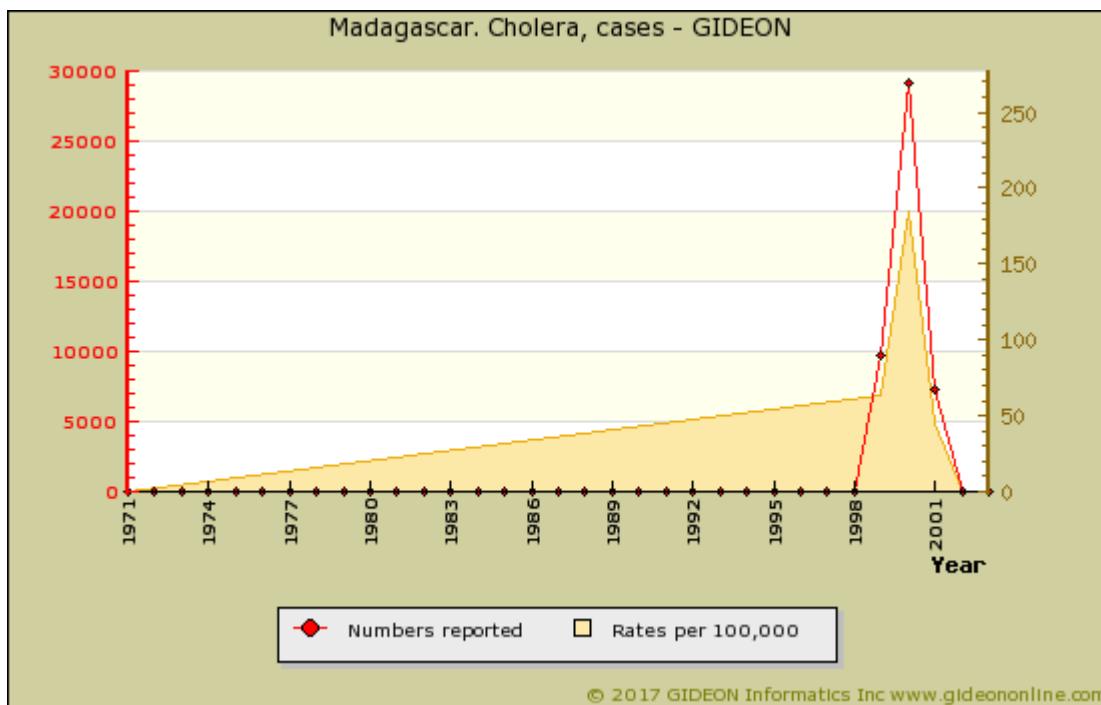
Fianarantsoa Province:

- Vohipeno District

Majunga (Mahajanga) Province:

- Ambato-Boeni District
- Analalava District
- Bealanana District
- Befandriana Nord District
- Maevatanana District
- Mahajanga I District
- Mahajanga II District
- Mampikony District
- Mandrtsara District
- Marovoay District
- Mitsinjo District
- Port Berge District

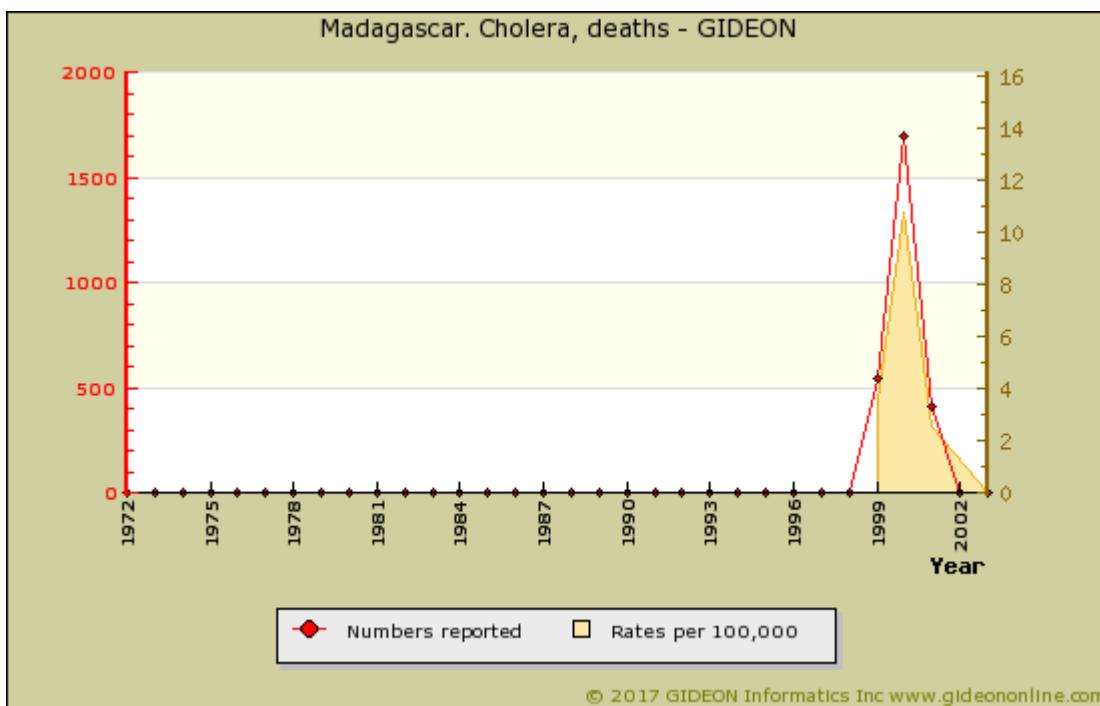
Soalala District
Toliary Province:
Amboasary Sud District
Belo sur Tsiribinina District
Mahabo District
Morondava District
Toliary I District
Toliary II District
Tsihombe District



Graph: Madagascar. Cholera, cases

Notes:

1. 0.1% to 2% of the population were infected during 1999 to 2000. ¹
 2. The true annual incidence of cholera during 2000 to 2008 was estimated at 23,180 cases (881 fatal). ²
- Individual years:
1999 - Cases in Antananarivo, Antsiranana, Fianarantsoa, Mahajanga, Toamasina and Toliary Provinces.



Graph: Madagascar. Cholera, deaths

Notable outbreaks

Years	Region	Cases	Notes
1999 - 2000	multiple locations	31,095	Outbreak in Majunga Province, Diego-Suarez and Antananarivo. 3 4 5 6 7 8

References

1. Sante 2000 Jul-Aug;10(4):277-86.
2. Bull World Health Organ 2012 Mar 01;90(3):209-218A.
3. Lancet 1999 Jun 12;353(9169):2068.
4. Sante 2000 Jul-Aug;10(4):277-86.
5. Arch Inst Pasteur Madagascar 2001 ;67(1-2):6-13.
6. Sante 2001 Apr-Jun;11(2):73-8.
7. ProMED <promedmail.org> archive: 19991114.2027
8. ProMED <promedmail.org> archive: 19990404.0538

Chromomycosis

Agent	FUNGUS. Ascomycota, Euascomycetes, Chaetothyriales. Dematiaceous molds: <i>Phialophora</i> , <i>Cladiophialophora</i> , <i>Fonsecaea</i> , <i>Rhinocladiella</i>
Reservoir	Wood, Soil, Vegetation
Vector	None
Vehicle	Minor trauma
Incubation Period	14d - 90d
Diagnostic Tests	Biopsy and fungal culture.
Typical Adult Therapy	<i>Itraconazole</i> 100 mg PO QID X (up to) 18 m. OR (for late disease) <i>Flucytosine</i> 25 mg/kg QID X 4m. OR <i>Posaconazole</i> 400 mg PO BID <i>Terbinafine</i> has been used in some cases. Local heat; excision as necessary
Typical Pediatric Therapy	<i>Itraconazole</i> 1 mg/kg PO BID X (up to) 18 m. OR <i>Ketoconazole</i> (if age >2) 5 mg/kg/d X 3 to 6m. Local heat; excision as necessary
Clinical Hints	Violaceous, verrucous, slowly-growing papule(s) or nodules Most commonly on lower extremities Usually follows direct contact with plant matter in tropical regions
Synonyms	Chromoblastomycosis, Chromomykose, Phoma insulana, Veronaea, Verrucous dermatitis. ICD9: 117.2 ICD10: B43.0

Chromomycosis in Madagascar

The first case was confirmed in 1944.

1,343 cases were reported during 1955 to 1994.

Rates of 15 per 100,000 are reported for the Antandray region.

Fonsecaea pedrosoi was isolated from 61.8%, and accounts for infection from the evergreen forest region. ¹

- *Cladophialophora (Cladosporium) carionii* is found in the spiny desert region.

References

1. Am J Trop Med Hyg 1996 Jul ;55(1):45-7.

Chronic meningococcemia

Agent	BACTERIUM. <i>Neisseria meningitidis</i> An aerobic gram-negative coccus
Reservoir	Human
Vector	None
Vehicle	Air, Infected secretions
Incubation Period	Unknown
Diagnostic Tests	Blood culture. Test patient for complement component deficiency.
Typical Adult Therapy	Intravenous Penicillin G 20 million units daily X 7 days
Typical Pediatric Therapy	Intravenous Penicillin G 200,000 units daily X 7 days
Clinical Hints	Recurrent episodes of low-grade fever, rash, arthralgia and arthritis May persist for months Rash is distal and prominent near joints and may be maculopapular, petechial or pustular In some cases, associated with complement component-deficiency
Synonyms	Meningococcemia, chronic. ICD9: 036.2 ICD10: A39.3

Clostridial food poisoning

Agent	BACTERIUM. <i>Clostridium perfringens</i> An anaerobic gram-positive bacillus
Reservoir	Soil, Human, Pig, Cattle, Fish, Poultry
Vector	None
Vehicle	Food
Incubation Period	8h - 14h (range 5h - 24h)
Diagnostic Tests	Laboratory diagnosis is usually not practical. Attempt culture of food for <i>C. perfringens</i> .
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Abdominal pain and watery diarrhea Usually no fever or vomiting Onset 8 to 14 hours after ingestion of meat, fish or gravy Fecal leukocytes not seen Most cases resolve within 24 hours.
Synonyms	

Clostridial myonecrosis

Agent	BACTERIUM. <i>Clostridium perfringens</i> An anaerobic gram-positive bacillus
Reservoir	Soil, Human
Vector	None
Vehicle	Soil, Trauma
Incubation Period	6h - 3d
Diagnostic Tests	Gram stain of exudate. Wound and blood cultures. Presence of gas in tissue (not specific).
Typical Adult Therapy	Prompt, aggressive debridement. Penicillin G 3 million units IV Q3h + Clindamycin 900 mg IV Q8h. Hyperbaric oxygen
Typical Pediatric Therapy	Prompt, aggressive debridement. Penicillin G 50,000 units/kg IV Q3h + Clindamycin 10 mg/kg IV Q6h. Hyperbaric oxygen
Vaccine	Gas gangrene antitoxin
Clinical Hints	Rapidly progressive tender and foul-smelling infection of muscle Local gas present - crepitus or visible on X-ray Hypotension, intravascular hemolysis and obtundation
Synonyms	Anaerobic myonecrosis, Clostridial gangrene, Gas gangrene. ICD9: 040.0 ICD10: A48.0

Clostridium difficile colitis

Agent	BACTERIUM. <i>Clostridium difficile</i> An anaerobic gram-positive bacillus
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Assay of stool for C. difficile toxin.
Typical Adult Therapy	Metronidazole 500 mg PO TID X 10d. OR Vancomycin 125 mg (oral preparation) QID X 10d OR Fidaxomicin 200 mg PO BID X 10d Fecal transplantation (PO or by enema) has been effective in some cases.
Typical Pediatric Therapy	Vancomycin 2 mg/kg (oral preparation) QID X 10d
Clinical Hints	Fever, leukocytosis and abdominal pain Mucoid or bloody diarrhea during or following antibiotic therapy Fecal leucocytes are seen Suspect this diagnosis even when mild diarrhea follows antibiotic intake
Synonyms	Klebsiella oxytoca colitis, Pseudomembranous colitis. ICD9: 008.45 ICD10: A04.7

Common cold

Agent	VIRUS - RNA. Picornaviridae. Rhinoviruses, Coronavirus, et al.
Reservoir	Human
Vector	None
Vehicle	Droplet, Contact, Respiratory or pharyngeal acquisition
Incubation Period	1d - 3d
Diagnostic Tests	Viral culture and serology are available, but not practical.
Typical Adult Therapy	Supportive; Pleconaril under investigation
Typical Pediatric Therapy	As for adult
Clinical Hints	Nasal obstruction or discharge, cough and sore throat are common Fever above 38 C is common in children, but unusual in adults Illness typically persists for one week, occasionally two
Synonyms	Acute coryza, Raffreddore. ICD9: 079,460 ICD10: J00

Conjunctivitis - inclusion

Agent	BACTERIUM. <i>Chlamydiae</i> , <i>Chlamydia trachomatis</i>
Reservoir	Human
Vector	None
Vehicle	Infected secretions, Sexual contact, Water (swimming pools)
Incubation Period	5d - 12d
Diagnostic Tests	Demonstration of chlamydiae on direct fluorescence or culture of exudate.
Typical Adult Therapy	Secretion precautions. Topical Erythromycin . Erythromycin 250 mg PO QID. X 14 days OR Doxycycline 100 mg PO BID X 14 days
Typical Pediatric Therapy	Secretion precautions. Topical Erythromycin . Azithromycin 1 g PO as single dose. Alternative If age >8 years, Doxycycline 100 mg PO BID X 7 days.
Clinical Hints	Ocular foreign body sensation, photophobia and discharge Illness can persist for months, to as long as 2 years;
Synonyms	Inclusion conjunctivitis, Paratrachoma. ICD9: 077.0 ICD10: P39.1,A74.0

Conjunctivitis - viral

Agent	VIRUS. Picornavirus, Adenovirus
Reservoir	Human
Vector	None
Vehicle	Contact
Incubation Period	1d - 3d
Diagnostic Tests	Viral isolation is available but rarely practical.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Watery discharge, generalized conjunctival injection and mild pruritus May be associated with an upper respiratory infection.
Synonyms	Apollo conjunctivitis, Apollo eye, Congiuntivite virale, Hemorrhagic conjunctivitis, Viral conjunctivitis. ICD9: 077.1,077.2,077.3,077.4,077.8,372.0 ICD10: B30,B30.3,H10

Conjunctivitis - viral in Madagascar

Notable outbreaks

Years	Region	Clinical	Notes
1984*	Antananarivo	conjunctivitis - acute hemorrhagic	1
1991		conjunctivitis - acute hemorrhagic	2
2012		conjunctivitis - acute hemorrhagic	

* indicates publication year (not necessarily year of outbreak)

References

1. Arch Inst Pasteur Madagascar 1984 ;51(1):145-51.
2. Rev Int Trach Pathol Ocul Trop Subtrop Sante Publique 1994 ;71:115-24.

Crimean-Congo hemorrhagic fever

Agent	VIRUS - RNA. Bunyaviridae, Nairovirus: CCHF virus. Infections also ascribed to related agents (Nairobi sheep and Dugbe viruses)
Reservoir	Hare, Bird, Tick, Cattle, Sheep, Goat
Vector	Tick (<i>Hyalomma</i> - over 30 potential vectors in this genus)
Vehicle	Infected secretions from patient or livestock, Respiratory or pharyngeal acquisition
Incubation Period	1d - 6d (range 2d - 53d)
Diagnostic Tests	Viral culture (blood, CSF, tissue). Serology. Nucleic acid amplification. Biosafety level 4.
Typical Adult Therapy	Isolation. Supportive therapy. Ribavirin : 1g PO QID X 4d, then 0.5g QID X 6d
Typical Pediatric Therapy	Isolation. Supportive therapy Ribavirin (dosage not established)
Clinical Hints	Headache, chills, myalgia, abdominal pain and photophobia Conjunctivitis and pharyngitis are often present Petechiae, thrombocytopenia and leukopenia are common Onset 3 to 7 days following a tick bite or exposure to infected patient Case-fatality rate is approximately 30%
Synonyms	Acute infectious capillary toxinosis, CCHF, Crimea Congo hemorrhagic fever, Dugbe, Erve, Ganjam, Kemerovo, Nairobi sheep, Tribec, Xinjiang hemorrhagic fever. ICD9: 065.0 ICD10: A98.0

Crimean-Congo hemorrhagic fever in Madagascar

Seroprevalence surveys

Years	Study Group	%	Notes
2008 - 2009	abattoir workers	0.75	0.75% of slaughterhouse workers ¹

References

1. [J Clin Virol 2011 Dec ;52\(4\):370-2.](#)

Cryptococcosis

Agent	FUNGUS - Yeast. Basidiomycota, Hymenomycetes, Sporidiales: <i>Cryptococcus neoformans</i> and other species
Reservoir	Pigeon, Soil
Vector	None
Vehicle	Air, Respiratory or pharyngeal acquisition
Incubation Period	Variable
Diagnostic Tests	Fungal culture and stains. Latex test for fungal antigen in CSF and serum. Nucleic acid amplification.
Typical Adult Therapy	Amphotericin B 0.3 mg/kg/d X 6w (+/- Flucytosine); then 0.8 mg/kg qod X 8w. OR Fluconazole 200 mg/d
Typical Pediatric Therapy	Amphotericin B 0.3 mg/kg/d X 6w (+/- Flucytosine); then 0.8 mg/kg qod X 8w. OR Fluconazole 3 mg/kg/d
Clinical Hints	Chronic lymphocytic meningitis or pneumonia in an immune-suppressed patient Meningitis may be subclinical, or "wax and wane" Nuchal rigidity is absent or minimal; Bone, skin, adrenals, liver, prostate and other sites may be infected hematogenously
Synonyms	Busse-Buschke disease, <i>Cryptococcus</i> , European blastomycosis, Torulosis. ICD9: 117.5,321.0 ICD10: B45

Cryptosporidiosis

Agent	PARASITE - Protozoa. Apicomplexa, Eimeriida: <i>Cryptosporidium hominis</i> and <i>C. parvum</i> (rarely <i>C. muris</i> , <i>C. felis</i> , <i>C. meleagridis</i> , et al).
Reservoir	Mammal (over 150 species)
Vector	None
Vehicle	Water, Feces, Oysters, Fly
Incubation Period	5d - 10d (range 2d - 14d)
Diagnostic Tests	Stool/duodenal aspirate for acid-fast, direct fluorescence staining, or antigen assay. Nucleic acid amplification
Typical Adult Therapy	Stool precautions. Nitazoxanide 500 mg PO BID X 3 days
Typical Pediatric Therapy	Stool precautions. Nitazoxanide: 1 to 3 years: 100 mg PO BID X 3 days 4 to 11 years: 200 mg PO BID X 3 days >12 years: 500 mg PO BID X 3 days
Clinical Hints	Watery diarrhea, vomiting, abdominal pain Self-limited disease in healthy subjects Immunosuppressed (e.g., AIDS) patient experience a chronic and wasting illness, which may be associated with pulmonary disease
Synonyms	<i>Cryptosporidium</i> , <i>Cryptosporidium andersoni</i> , <i>Cryptosporidium chipmunk genotype</i> , <i>Cryptosporidium cuniculus</i> , <i>Cryptosporidium fayeri</i> , <i>Cryptosporidium felis</i> , <i>Cryptosporidium hedgehog genotype</i> , <i>Cryptosporidium hominis</i> , <i>Cryptosporidium meleagridis</i> , <i>Cryptosporidium parvum</i> , <i>Cryptosporidium pestis</i> , <i>Cryptosporidium suis</i> , <i>Cryptosporidium tyzzeri</i> , <i>Cryptosporidium ubiquitum</i> , <i>Cryptosporidium viatorum</i> , <i>Kryptosporidiose</i> . ICD9: 007.4 ICD10: A07.2

Cryptosporidiosis in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
2004 - 2005	Antananarivo	children	5.6	5.6% of cases of acute diarrhea in children managed at hospitals and rehydration clinics ¹

Cryptosporidium suis has been identified in humans, cattle, pigs and rodents in rural Madagascar (2014 publication) ²

Cryptosporidium species have been identified in geckos (*Phelsuma madagascariensis grandis*) ³ and wild lemur populations. ⁴

References

- 1. Ann Trop Med Parasitol 2008 Jun ;102(4):309-15.
- 2. Vet Parasitol 2015 Jan 15;207(1-2):140-3.
- 3. J Protozool 1987 Nov ;34(4):452-4.
- 4. Am J Primatol 2008 Feb ;70(2):175-84.

Cutaneous larva migrans

Agent	PARASITE - Nematoda. Secernentea: <i>Ancylostoma braziliense</i> , <i>A. caninum</i> , <i>Bunostomum phlebotomum</i> , <i>Strongyloides myopotami</i>
Reservoir	Cat, Dog, Cattle
Vector	None
Vehicle	Soil, Contact
Incubation Period	2d - 3d (range 1d - 30d)
Diagnostic Tests	Biopsy is usually not helpful.
Typical Adult Therapy	Albendazole 200 mg BID X 3d OR Ivermectin 200 micrograms/kg as single dose. OR Thiabendazole topical, and oral 25 mg/kg BID X 5d (max 3g).
Typical Pediatric Therapy	Albendazole 2.5 mg/kg BID X 3d OR Ivermectin 200 micrograms/kg once OR Thiabendazole topical, and oral 25 mg/kg BID X 5d (max 3g).
Clinical Hints	Erythematous, serpiginous, intensely pruritic and advancing lesion(s) or bullae Usually involves the feet Follows contact with moist sand or beach May recur or persist for months.
Synonyms	Creeping eruption, Pelodera, Plumber's itch. ICD9: 126.2,126.8,126.9 ICD10: B76.9

Cyclosporiasis

Agent	PARASITE - Protozoa. Apicomplexa, Eimeriida: <i>Cyclospora cayetanensis</i>
Reservoir	Human, Non-human primate
Vector	None
Vehicle	Water, Vegetables
Incubation Period	1d - 11d
Diagnostic Tests	Identification of organism in stool smear. Cold acid fast stains and ultraviolet microscopy may be helpful.
Typical Adult Therapy	Sulfamethoxazole / Trimethoprim 800/160 mg BID X 7d Ciprofloxacin 500 mg PO BID X 7 d (followed by 200 mg TIW X 2 w) has been used in sulfa-allergic patients
Typical Pediatric Therapy	Sulfamethoxazole / Trimethoprim 10/2 mg/kg BID X 7d
Clinical Hints	Watery diarrhea (average 6 stools daily) Abdominal pain, nausea, anorexia and fatigue May persist for up to 6 weeks (longer in AIDS patients) Most cases follow ingestion of contaminated water in underdeveloped countries Large outbreaks have been associated with ingestion of contaminated fruit
Synonyms	Cryptosporidium muris, Cyanobacterium-like agent, Cyclospora. ICD9: 007.5 ICD10: A07.8

Cysticercosis

Agent	PARASITE - Platyhelminthes, Cestoda. Cyclophyllidea, Taeniidae: <i>Taenia solium</i>
Reservoir	Pig, Human
Vector	None
Vehicle	Soil (contaminated by pigs), Fecal-oral, Fly
Incubation Period	3m - 3y
Diagnostic Tests	Serology (blood or CSF) and identification of parasite in biopsy material.
Typical Adult Therapy	Albendazole 400 mg PO BID X 30d. OR Praziquantel 30 mg/kg TID X 14d (15 to 30d for neurocysticercosis). Combination of Albendazole + Praziquantel may be superior for neurocysticercosis. Surgery as indicated Add corticosteroids if brain involved.
Typical Pediatric Therapy	Albendazole 15 mg/kg PO BID X 30d. OR Praziquantel 30 mg/kg TID X 14d (15 to 30d for neurocysticercosis). Combination of Albendazole + Praziquantel may be superior for neurocysticercosis. Surgery as indicated Add corticosteroids if brain involved.
Clinical Hints	Cerebral, ocular or subcutaneous mass Usually no eosinophilia Calcifications noted on X-ray examination Associated with regions where pork is eaten 25% to 50% of patients have concurrent tapeworm infestation
Synonyms	Taenia crassiceps, Taenia martis. ICD9: 123.1 ICD10: B69

Cysticercosis in Madagascar

Human cysticercosis has been identified in Madagascar since 1901.

A review of veterinary cysticercosis control in Madagascar (2013 publication) - see reference ¹

Prevalence surveys

Years	Region	Study Group	%	Notes
1993	Antananarivo	children	2	2% of pediatric hospitalizations in Antananarivo
2007*		patients - CNS	25	25% of seizure disorders in Madagascar ²
2008 - 2012		pigs	0.5	0.5% to 1% of pork carcasses ³

* indicates publication year (not necessarily year of survey)

Seroprevalence surveys

Years	Region	Study Group	%	Notes
1994 - 1999	multiple locations	general population	20	20% of the population of Ihosy, Ambositra and Mahasolo ^{4 5}
1999	Mahajanga	general population	16.5	16.5% of the population of Mahajanga
2003*		general population	7-20	7% to 20% of the population - highest rates in the central highlands and less than 10% in coastal regions ⁶
2003*		patients - CNS	36	18% of the population above age 15, and 36% of patients with neurological disease

Years	Region	Study Group	%	Notes
2003*		patients - CNS	20-25	20% to 25% of late-onset epileptics

* indicates publication year (not necessarily year of survey)

55% of cases involve the brain, and 5% the eyes.

As of 2010, there were over 500,000 pig herds (1,380,000 pigs) in Madagascar.⁷

- Most cases of pig infestation are reported from the central Highlands, with Vakinsnkaratra accounting for 48%.

2006 (publication year) - A French traveler acquired neurocysticercosis in Madagascar.⁸

References

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3. Trends Parasitol 2013 Nov ;29(11):538-47.
4. Arch Inst Pasteur Madagascar 2003 ;69(1-2):46-51.
5. Mol Phylogenet Evol 2010 May ;55(2):744-50.
6. Arch Inst Pasteur Madagascar 2003 ;69(1-2):46-51.
7. Trends Parasitol 2013 Nov ;29(11):538-47.
8. J Infect 2006 Jul ;53(1):e35-8.

Cytomegalovirus infection

Agent	VIRUS - DNA. Herpesviridae, Betaherpesvirinae: Human herpesvirus 5 (Cytomegalovirus)
Reservoir	Human
Vector	None
Vehicle	Droplet (respiratory), Urine, Dairy products, Tears, Stool, Sexual, contact (rare), Transplacental, Breastfeeding
Incubation Period	3w - 5w (range 2w - 12w)
Diagnostic Tests	Viral culture (blood, CSF, urine, tissue). Serology. Direct viral microscopy. Nucleic acid amplification
Typical Adult Therapy	(Most cases self-limited). Ganciclovir 5 mg/kg q12h IV X 2 to 3w. OR Foscarnet 90 mg/kg Q12h IV OR Cidofovir 5 mg/kg IV weekly
Typical Pediatric Therapy	(Most cases self-limited) Ganciclovir 5 mg/kg q12h IV X 2 to 3w
Vaccine	Cytomegalovirus immunoglobulin
Clinical Hints	Heterophile-negative "mononucleosis" Mild pharyngitis, without exudate Variable degree of lymphadenopathy and splenomegaly Retinitis in AIDS patients Pneumonia in setting of immune suppression Congenital infection characterized by multisystem disease in newborns
Synonyms	Cytomegalovirus, Zytomegalie. ICD9: 078.5 ICD10: B25

Dengue

Agent	VIRUS - RNA. Flaviviridae, Flavivirus: Dengue virus
Reservoir	Human, Mosquito, Monkey (in Malaysia and Africa)
Vector	Mosquito - <i>Stegomyia (Aedes) aegypti</i> , <i>S. albopictus</i> , <i>S. polynesiensis</i> , <i>S. scutellaris</i>
Vehicle	Blood, Breastfeeding
Incubation Period	5d - 8d (range 2d - 15d)
Diagnostic Tests	Viral isolation (blood). Serology. Nucleic acid amplification. Biosafety level 2.
Typical Adult Therapy	Supportive; IV fluids to maintain blood pressure and reverse hemoconcentration
Typical Pediatric Therapy	As for adult
Vaccine	Dengue vaccine
Clinical Hints	Headache, myalgia, arthralgia Relative bradycardia, leukopenia and macular rash Severe dengue (DHF or dengue-shock syndrome) defined as dengue with thrombocytopenia, hemoconcentration and hypotension.
Synonyms	Bouquet fever, Break-bone fever, Dandy fever, Date fever, Dengue Fieber, Duengero, Giraffe fever, Petechial fever, Polka fever. ICD9: 061 ICD10: A90,A91

Dengue in Madagascar

Serosurveys confirmed the presence of dengue on Nosy-B and Nosy-Komba in 1977. ¹

Seropositivity has been reported among lemurs (1988 publication). ²

In recent years, the range of *Aedes albopictus* in Madagascar has extended, while that of *Ae. aegyptius* has become more restricted (2007 to 2009). ³

Seroprevalence surveys

Years	Study Group	%	Notes
2009	pregnant women	11-17	11% and 17% of pregnant women in two eastern coastal towns, following an outbreak of fever and joint pain ⁴

Notable outbreaks

Years	Region	Notes
2006	Toamasina	⁵

References

- Arch Inst Pasteur Madagascar 1988 ;54(1):101-15.
- Bull Soc Pathol Exot Filiales 1988 ;81(1):58-70.
- Parasit Vectors 2012 Mar 20;5:56.
- Emerg Infect Dis 2012 Nov ;18(11):1780-6.
- Wkly Epidemiol Rec 2006 Mar 24;81(12):106-8.

Dermatophytosis

Agent	FUNGUS. Ascomycota, Euascomyces, Onygenales: <i>Epidermophyton</i> , <i>Microsporum</i> , <i>Trichophyton</i> , <i>Trichosporon</i> spp., <i>Arthroderma</i> , et al
Reservoir	Human, Dog, Cat, Rabbit, Marsupial, Other mammal
Vector	None
Vehicle	Contaminated soil/flooring, Animal Contact
Incubation Period	2w - 38w
Diagnostic Tests	Fungal culture and microscopy of skin, hair or nails. Nucleic acid amplification.
Typical Adult Therapy	Skin - topical Clotrimazole, <i>Miconazole</i> , etc. Hair/nails - <i>Terbinafine</i> , <i>Griseofulvin</i> , <i>Itraconazole</i> or <i>Fluconazole</i> PO
Typical Pediatric Therapy	As for adult
Clinical Hints	Erythematous, circinate, scaling or dyschromic lesions of skin, hair or nails Pruritus, secondary infection or regional lymphadenopathy may be present
Synonyms	Arthroderma, Dermatomicose, Dermatomycose, Dermatomykose, Dermatomykosen, Emericella, Favus, Granuloma trichophyticum, Gruby's disease, Kodamaea, Leukonychia trichophytica, Microsporum, Nattrassia, Onychocola, Onychomycosis, Pityriasis versicolor, Ringworm, Saint Aignan's disease, Scopulariopsis, Scytalidium, Tinea, Tinea barbae, Tinea capitis, Tinea corporis, Tinea cruris, Tinea favosa, Tinea imbricata, Tinea manum, Tinea pedis, Tinea unguinum, Tokelau ringworm, Triadelphia pulvinata, Trichomycosis, Trichophytosis, Trichophytosis gladiatorium. ICD9: 110,111 ICD10: B35,B36

Dermatophytosis in Madagascar

Notable outbreaks

Years	Region	Cases	Clinical	Population	Notes
2011*	Antananarivo	42	various presentations	schoolchildren	Outbreak of Tinea capitis and Tinea corporis ¹

* indicates publication year (not necessarily year of outbreak)

References

1. J Infect Dev Ctries 2011 Oct 13;5(10):732-6.

Dientamoeba fragilis infection

Agent	PARASITE - Protozoa. Metamonada, Parabasala, Trichomonadea. Flagellate: <i>Dientamoeba fragilis</i>
Reservoir	Human, Gorilla, Pig
Vector	None
Vehicle	Fecal-oral (ingestion of pinworm ova)
Incubation Period	8d - 25d
Diagnostic Tests	Identification of trophozoites in stool. Nucleic acid amplification. Alert laboratory if this diagnosis is suspected.
Typical Adult Therapy	Stool precautions. Iodoquinol 650 mg PO TID X 20d. OR Tetracycline 500 mg QID X 10d. OR Paromomycin 10 mg/kg TID X 7d OR Metronidazole 750 mg PO TID X 10d
Typical Pediatric Therapy	Stool precautions. Iodoquinol 13 mg/kg PO TID X 20d. OR (age >8) Tetracycline 10 mg/kg QID X 10d OR Paromomycin 10 mg/kg TID X 7d OR Metronidazole 15 mg/kg PO TID X 10d
Clinical Hints	Abdominal pain with watery or mucous diarrhea Eosinophilia may be present Concurrent enterobiasis (pinworm) is common Infestation may persist for more than one year
Synonyms	

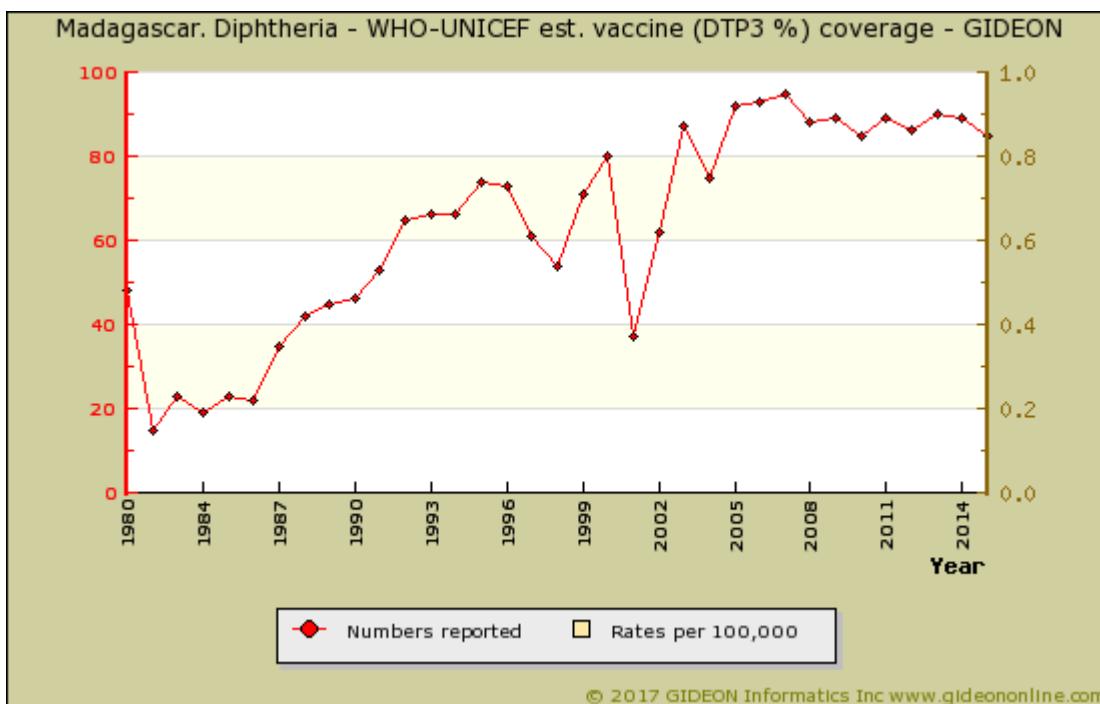
Diphtheria

Agent	BACTERIUM. <i>Corynebacterium diphtheriae</i> A facultative gram-positive bacillus
Reservoir	Human
Vector	None
Vehicle	Droplet, Contact, Dairy products, Clothing
Incubation Period	2d - 5d (range 1d - 10d)
Diagnostic Tests	Culture on special media. Advise laboratory when this diagnosis is suspected.
Typical Adult Therapy	Respiratory isolation. Equine antitoxin 20,000 to 80,000 units IM. (first perform scratch test) <i>Erythromycin</i> 500 mg QID (or Penicillin preparation) X 14d
Typical Pediatric Therapy	Respiratory isolation. Equine antitoxin 1,000 units/kg IM. (first perform scratch test) <i>Erythromycin</i> 10 mg/kg QID (or penicillin preparation) X 14d
Vaccines	<i>Diphtheria antitoxin</i> <i>Diphtheria vaccine</i> <i>DTP vaccine</i> <i>DT vaccine</i> <i>DTaP vaccine</i> <i>Td vaccine</i>
Clinical Hints	Pharyngeal membrane with cervical edema and lymphadenopathy "Punched out" skin ulcers with membrane Myocarditis or neuropathy (foot/wrist drop) may appear weeks following initial infection
Synonyms	<i>Corynebacterium diphtheriae</i> , Difteri, Difteria, Difterie, Difterite, Diphterie. ICD9: 032 ICD10: A36

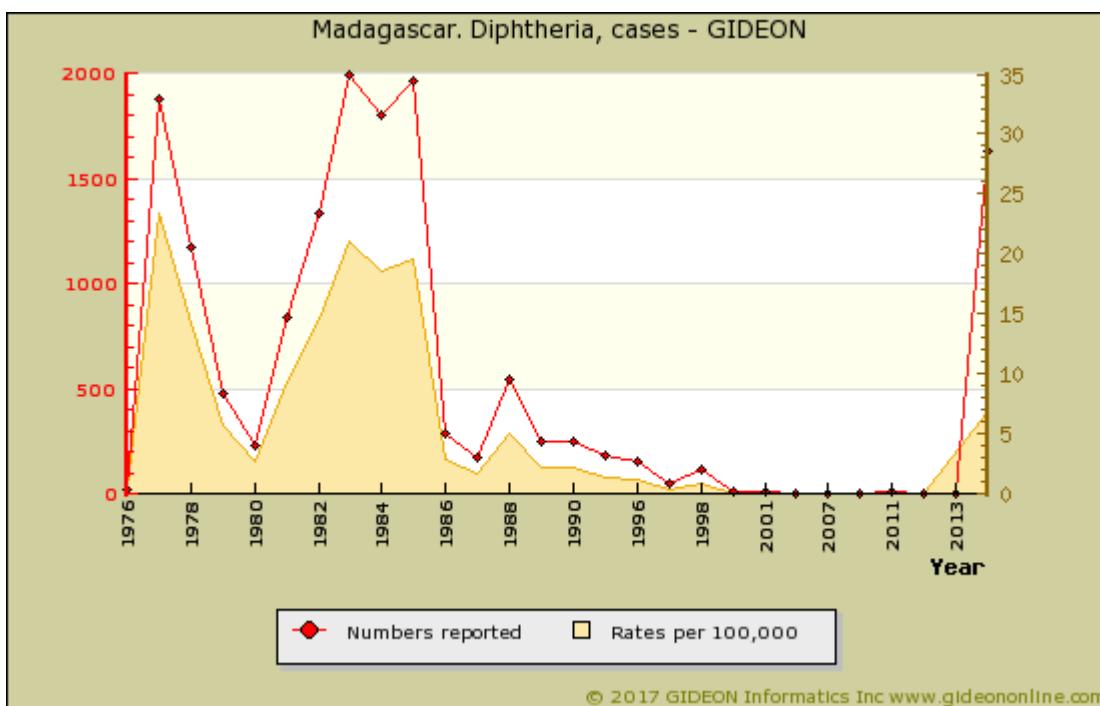
Diphtheria in Madagascar

Vaccine Schedule:

BCG - birth
 DTwPHibHepB - 6,10,14 weeks
 IPV - 14 weeks
 Measles - 9 months
 OPV - birth; 6,10,14 weeks
 Pneumo conj - 6,10,14 weeks
 Rotavirus - 6,10 weeks
 TT - 1st contact pregnancy; +1, +6 months; +1, +1 year



Graph: Madagascar. Diphtheria - WHO-UNICEF est. vaccine (DTP3 %) coverage



Graph: Madagascar. Diphtheria, cases

Diphyllobothriasis

Agent	PARASITE - Platyhelminthes, Cestoda. Pseudophyllidea, Diphyllobothriidae: <i>Diphyllobothrium latum</i> , et al
Reservoir	Human, Dog, Bear, Fish-eating mammal
Vector	None
Vehicle	Fresh-water fish - notably (for <i>D. latum</i>) perch, burbot and pike
Incubation Period	4w - 6w (range 2w - 2y)
Diagnostic Tests	Identification of ova or proglottids in feces.
Typical Adult Therapy	Praziquantel 10 mg/kg PO as single dose OR Niclosamide 2 g PO once
Typical Pediatric Therapy	Praziquantel 10 mg/kg PO as single dose OR Niclosamide 50 mg/kg PO once
Clinical Hints	Abdominal pain, diarrhea and flatulence Vitamin B12 deficiency is noted in 0.02% of patients Rare instances of intestinal obstruction have been described Worm may survive for decades in the human intestine
Synonyms	Adenocephalus pacificus, Bandwurmer [Diphyllobothrium], Bothriocephalus acheilognathi, Bothriocephalus latus, Broad fish tapeworm, Diphyllobothrium cordatum, Diphyllobothrium dalliae, Diphyllobothrium dendriticum, Diphyllobothrium klebanovskii, Diphyllobothrium latum, Diphyllobothrium nihonkaiense, Diphyllobothrium stummacephalum, Diphyllobothrium ursi, Diplogonoporiasis, Fish tapeworm. ICD9: 123.4 ICD10: B70.0

Dipylidiasis

Agent	PARASITE - Platyhelminthes, Cestoda. Cyclophyllidea, Dipylidiidae: <i>Dipylidium caninum</i>
Reservoir	Dog, Cat
Vector	None
Vehicle	Ingested flea (<i>Ctenocephalides</i> spp.)
Incubation Period	21d - 28d
Diagnostic Tests	Identification of proglottids in feces.
Typical Adult Therapy	Praziquantel 10 mg/kg PO as single dose OR Niclosamide 2 g PO once
Typical Pediatric Therapy	Praziquantel 10 mg/kg PO as single dose OR Niclosamide 50 mg/kg PO once
Clinical Hints	Diarrhea, abdominal distention and restlessness (in children) Eosinophilia present in some cases Proglottids may migrate out of the anus
Synonyms	Cucumber tapeworm, <i>Dipylidium caninum</i> , Dog tapeworm, Double-pored dog tapeworm. ICD9: 123.8 ICD10: B71.1

Dirofilariasis

Agent	PARASITE - Nematoda. Secernentea: <i>Dirofilaria (Nochtiella) immitis</i> (pulmonary); <i>D. tenuis</i> & <i>D. repens</i> (subcutaneous infection) & <i>D. ursi</i>
Reservoir	Mammal, Dog, Wild carnivore (<i>D. tenuis</i> in raccoons; <i>D. ursi</i> in bears)
Vector	Mosquito
Vehicle	None
Incubation Period	60d - 90d
Diagnostic Tests	Identification of parasite in tissue. Serology. Nucleic acid amplification.
Typical Adult Therapy	Not available; excision is often diagnostic and curative
Typical Pediatric Therapy	As for adult
Clinical Hints	Most patients are asymptomatic Cough and chest pain in some cases Solitary pulmonary coin lesion seen on imaging Multiple tender subcutaneous nodules may be present Eosinophilia is usually absent
Synonyms	Candidatus <i>Dirofilaria hongkongensis</i> , <i>Dirofilariosis</i> , <i>Dirofiliaria</i> , <i>Dog heartworm</i> , <i>Filaria conjunctivae</i> , <i>Loaina</i> . ICD9: 125.6 ICD10: B74.8

Ebola

Agent	VIRUS - RNA. Mononegavirales, Filoviridae, Filovirus: Ebola virus
Reservoir	Primate, Guinea pig, Bat, Forest antelope
Vector	None
Vehicle	Infected secretions, Contact, Needle, Syringe, Sexual contact, Breastfeeding, Respiratory or pharyngeal acquisition
Incubation Period	5d - 12d (range 1d - 21d)
Diagnostic Tests	Viral culture (blood, liver, spleen). Serology. Nucleic acid amplification. Biosafety level 4.
Typical Adult Therapy	Strict isolation; supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, myalgia, arthralgia, sore throat, vomiting, diarrhea, conjunctivitis, hepatic dysfunction and maculopapular rash Hemorrhagic diatheses beginning on the 3rd to 4th day of illness Reported case-fatality rates from 50% to 90%
Synonyms	Lloviu virus, Lomela, Makona, Tai Forest. ICD9: 065.8 ICD10: A98.4

Although Ebola is not endemic to Madagascar, imported, expatriate or other presentations of the disease have been associated with this country.

Ebola in Madagascar

4.5% of healthy adults are seropositive toward Ebolavirus. ¹

References

1. Trans R Soc Trop Med Hyg 1989 May-Jun;83(3):407-9.

Echinococcosis - unilocular

Agent	PARASITE - Platyhelminthes, Cestoda. Cyclophyllidae, Taeniidae: <i>Echinococcus granulosus</i> , <i>Echinococcus canadensis</i>
Reservoir	Dog, Wolf, Dingo, Sheep, Horse, Pig
Vector	None
Vehicle	Soil, Dog feces, Fly
Incubation Period	1y - 20y
Diagnostic Tests	Serology. Identification of parasite in surgical specimens.
Typical Adult Therapy	Albendazole 400 mg BID X 28d. Repeat X 3, with 2 week hiatus between cycles. Praziquantel has been used preoperatively to sterilize cyst. Follow by surgery as indicated. PAIR (puncture-aspiration-injection-reaspiration) is also used
Typical Pediatric Therapy	Albendazole 10 mg/kg/day X 28d. Repeat X 3, with 2 week hiatus between cycles. Praziquantel has been used preoperatively to sterilize cyst. Follow by surgery as indicated. PAIR (puncture-aspiration-injection-reaspiration) also used
Clinical Hints	Calcified hepatic cyst or mass lesions in lungs and other organs Brain and lung involvement are common in pediatric cases
Synonyms	<i>Echinococcus canadensis</i> , <i>Echinococcus granulosus</i> , <i>Echinococcus ortleppi</i> , Hydatid cyst, Unilocular echinococcosis. ICD9: 122.0,122.1,122.2,122.3,122.4 ICD10: B67.0,B67.1,B67.2,B67.3,B67.4

Echinococcosis - unilocular in Madagascar

Rare autochthonous infections are reported. ¹

References

1. [Arch Inst Pasteur Madagascar 1994 ;61\(2\):103-4.](#)

Endocarditis - infectious

Agent	BACTERIUM OR FUNGUS. viridans streptococci, <i>Staphylococcus aureus</i> , enterococci, <i>Candida albicans</i> , et al.
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Blood culture, clinical findings, ultrasonography of heart valves.
Typical Adult Therapy	Bactericidal antibiotic appropriate to species
Typical Pediatric Therapy	As for adult
Clinical Hints	Consider in any patient with prolonged and unexplained fever, Multisystem disease and a preexisting cardiac valvular lesion may be present Manifestations include skin lesions, hematuria, neurological symptoms, single or multiple abscesses or bone, brain, lung (etc)
Synonyms	Bacterial endocarditis, Endocardite, Endocarditis, Endokarditis, Fungal endocarditis, Infectious endocarditis, S.B.E.. ICD9: 421 ICD10: I33

Enterobiasis

Agent	PARASITE - Nematoda. Secernentea: <i>Enterobius vermicularis</i>
Reservoir	Human
Vector	None
Vehicle	Fecal-oral, Air, Clothing, Sexual contact
Incubation Period	14d - 42d
Diagnostic Tests	Apply scotch tape to anal verge in a.m. & paste onto glass slide for microscopy.
Typical Adult Therapy	Albendazole 400 mg PO as single dose - repeat in 2w. OR Mebendazole 100 mg PO as single dose - repeat in 2w. OR Pyrantel pamoate 11 mg/kg (max 1g) PO as single dose; or
Typical Pediatric Therapy	Mebendazole 100 mg PO as single dose (>age 2) - repeat in 2w. OR Pyrantel pamoate 11 mg/kg (max 1g) PO X 1
Clinical Hints	Nocturnal anal pruritus Occasionally presents with vaginitis or abdominal pain Eosinophilia is rarely, if ever, encountered
Synonyms	Enterobio, Enterobius vermicularis, Oxyuriasis, Oxyuris, Pinworm, Seatworm. ICD9: 127.4 ICD10: B80

Enterovirus infection

Agent	VIRUS - RNA. Picornaviridae: Coxsackievirus, ECHO virus, Enterovirus, Parechovirus
Reservoir	Human
Vector	None
Vehicle	Droplet, Fecal-oral, Breastfeeding, Respiratory or pharyngeal acquisition
Incubation Period	2d-7d
Diagnostic Tests	Viral culture (stool, pharynx, CSF). Serology. Nucleic acid amplification.
Typical Adult Therapy	Supportive. Pleconaril 200 to 400 mg PO TID X 7d has been used for severe infections
Typical Pediatric Therapy	Supportive. Pleconaril 5 mg/kg PO BID has been used for severe infections
Clinical Hints	Summer-to-autumn sore throat Specific forms present with conjunctivitis, chest pain, macular or vesicular rash, meningitis, myopericarditis, etc.
Synonyms	Boston exanthem [Caxsackie A 16], Coxsackie, Coxsackievirus, ECHO, Echovirus, Enteroviruses, Hand, foot and mouth disease, Hand-foot-and-mouth disease, Herpangina [Coxsackievirus A], HEV 68, HPeVs, Human Enterovirus 68, Human Parechovirus, Ljungan virus, Myocarditis, enteroviral, Parechovirus, Pericarditis, enteroviral. ICD9: 049,079.2,008.67,074.0,074.8,074.3,070.4,078.89 ICD10: A88.0,A87.0,B08.4,B08.5,B08.8,B30.3,B34.1

Enterovirus infection in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
1986*	Antananarivo	children	43	43% of outpatient children with diarrhea 1

* indicates publication year (not necessarily year of survey)

Notable outbreaks

Years	Region	Clinical	Notes
1984*	Antananarivo	conjunctivitis - acute hemorrhagic	2
1991		conjunctivitis - acute hemorrhagic	3
2012		conjunctivitis - acute hemorrhagic	

* indicates publication year (not necessarily year of outbreak)

References

- 1. [Arch Inst Pasteur Madagascar 1986 ;52\(1\):123-30.](#)
- 2. [Arch Inst Pasteur Madagascar 1984 ;51\(1\):145-51.](#)
- 3. [Rev Int Trach Pathol Ocul Trop Subtrop Sante Publique 1994 ;71:115-24.](#)

Entomophthoramycosis

Agent	FUNGUS. Zygomycota, Zygomycetes, Entomophthorales, Entomophthoramycota. <i>Basidiobolus</i> or <i>Conidiobolus</i>
Reservoir	Vegetation, Soil, Amphibian, Reptile
Vector	None
Vehicle	Air (inhalation), Direct inoculation, Respiratory or pharyngeal acquisition
Incubation Period	Unknown
Diagnostic Tests	Biopsy and fungal culture.
Typical Adult Therapy	Antifungal agents and excision as indicated. Oral potassium iodide may be helpful
Typical Pediatric Therapy	As for adult
Clinical Hints	Slowly-spreading subcutaneous nodule involving nose, upper face, pharynx Skin ulceration and systemic signs are absent
Synonyms	Basidiobolomycosis, Basidiobolus, Conidiobolosis, Conidiobolus, Rhinomycosis, Rhinophycomycosis entomophthorae, Subcutaneous phycomycosis, Subcutaneous zygomycosis. ICD9: 117.9 ICD10: B48.8

Epidural abscess

Agent	BACTERIUM. <i>Staphylococcus aureus</i> , facultative gram negative bacilli, etc
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Imaging (CT scan, MRI). Gram-stain and culture of blood or pus.
Typical Adult Therapy	Intravenous antibiotic(s) appropriate to identified or suspected pathogens. Drainage as indicated
Typical Pediatric Therapy	Intravenous antibiotic(s) appropriate to identified or suspected pathogen. Drainage as indicated
Clinical Hints	Frontal bone abscess; or spinal cord compression with signs of infection Often in setting of injecting drug abuse or preexisting staphylococcal infection
Synonyms	

Erysipelas or cellulitis

Agent	BACTERIUM. Erysipelas: <i>Streptococcus pyogenes</i> Cellulitis: <i>Staphylococcus aureus</i> , <i>Streptococcus pyogenes</i> , occasionally others
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	1d - 7d
Diagnostic Tests	Clinical diagnosis is usually sufficient. Aspiration of lesion for smear and culture may be helpful in some cases.
Typical Adult Therapy	Antibiotic directed at likely pathogens (Group A Streptococcus and Staphylococcus aureus)
Typical Pediatric Therapy	As for adult
Clinical Hints	Erysipelas is well-circumscribed, tender, edematous (peau d'orange), warm and painful Cellulitis is less painful, flat and without a distinct border
Synonyms	Cellulite, Cellulitis, Celulite, Celulitis, Erisipela, Erysipelas, St. Anthony's fire (erysipelas), St. Francis' fire (erysipelas), Zellulitis. ICD9: 035,681,682 ICD10: A46,L03

Erysipeloid

Agent	BACTERIUM. <i>Erysipelothrix rhusiopathiae</i> A facultative gram-positive bacillus
Reservoir	Mammal, Bird, Fish
Vector	None
Vehicle	Contact with meat (mammal, poultry or fish)
Incubation Period	1d - 4d
Diagnostic Tests	Culture.
Typical Adult Therapy	Oral therapy for 10 days: Penicillin V , Ampicillin , third-generation cephalosporin, Fluoroquinolone (Levofloxacin , Trovafloxacin , Pefloxacin , Sparfloxacin or Moxifloxacin), Erythromycin , Clindamycin or Tetracycline are generally adequate
Typical Pediatric Therapy	Oral therapy for 10 days: Penicillin V , Ampicillin , third-generation cephalosporin or Erythromycin , Clindamycin are generally adequate
Clinical Hints	Typically follows contact with raw animal or fish products Annular erythema or "target lesion" on hand Fever is present in only 10% of cases. Local pain and swelling, without discharge
Synonyms	Erysipelothrix rhusiopathiae, Rutlauf. ICD9: 027.1 ICD10: A26

Erythrasma

Agent	BACTERIUM. <i>Corynebacterium minutissimum</i> A facultative gram-positive bacillus
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Unknown
Diagnostic Tests	Coral fluorescence of skin lesion under Wood's lamp. Culture (alert lab regarding diagnosis).
Typical Adult Therapy	Erythromycin 250 mg PO QID X 14d. Topical Clindamycin 2% and topical Fusidic acid have also been used
Typical Pediatric Therapy	Erythromycin 10 mg/kg PO QID X 14d. Topical Clindamycin 2% and topical Fusidic acid have also been used
Clinical Hints	Pruritic, scaling, slowly-progressive red-brown patch Usually affects the groin - occasionally in toe webs Common in obese or diabetic males Coral fluorescence under Wood's light.
Synonyms	<i>Corynebacterium minutissimum</i> , Eritrasma. ICD9: 039.0 ICD10: L08.1

Escherichia coli diarrhea

Agent	BACTERIUM. <i>Escherichia coli</i> A facultative gram-negative bacillus
Reservoir	Human, Mammal
Vector	None
Vehicle	Food, Water, Fecal-oral
Incubation Period	1d - 3d (range 12h - 10d)
Diagnostic Tests	Stool culture. Request characterization of E. coli isolates.
Typical Adult Therapy	Supportive therapy. If EHEC, avoid anti-motility drugs and antimicrobial agents. Plasma exchange may be effective in HUS Note that antimicrobial agents may increase risk for hemolytic-uremic syndrome when used in cases of E. coli O157:H7 infection
Typical Pediatric Therapy	Supportive therapy. If EHEC, avoid anti-motility drugs and antimicrobial agents. Plasma exchange may be effective in HUS Note that antimicrobial agents may increase risk for hemolytic-uremic syndrome when used in cases of E. coli O157:H7 infection
Clinical Hints	Watery diarrhea or dysentery Common among travelers and infants Hemorrhagic colitis and hemolytic uremic syndrome are associated with type O157, and occasionally other strains
Synonyms	DAEC (Diffusely Adherent E. coli), E. coli diarrhea, EAEC (Enteroadherent E. coli), EAggEC (Enteropathogenic E. coli), EHEC (Enterohemorrhagic E. coli), EIEC (Enteroinvasive E. coli), EPEC (Enteropathogenic E. coli), Escherichia albertii, ETEC (Enterotoxic E. coli), Hemolytisch-uramisches Syndrom, Hemolytic Uremic Syndrome, HUS. ICD9: 008.0 ICD10: A04.0,A04.1,A04.2,A04.3,A04.4

Escherichia coli diarrhea in Madagascar

Prevalence surveys

Years	Study Group	%	Notes
1988 - 1989	children	10.5	EPEC was identified in 10.5% of children ages 0 to 14 years with diarrhea ¹

References

1. Arch Inst Pasteur Madagascar 1990 ;57(1):223-54.

Filariasis - Bancroftian

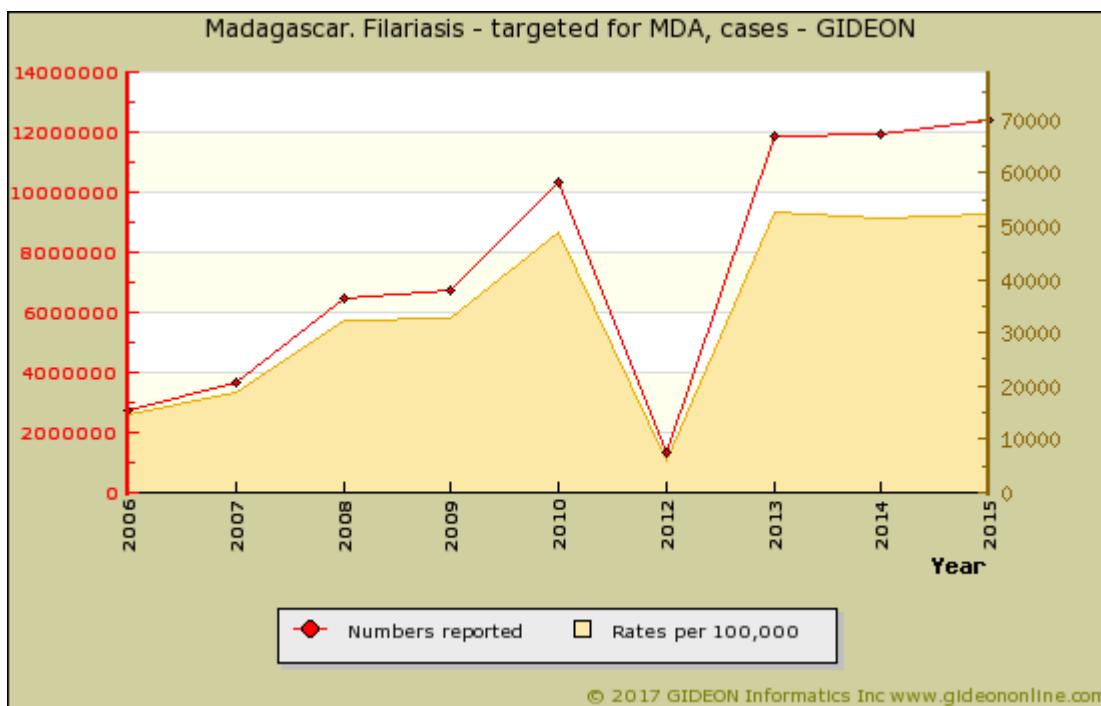
Agent	PARASITE - Nematoda. Secernentea: <i>Wuchereria bancrofti</i>
Reservoir	Human
Vector	Mosquito (<i>Anopheles, Aedes, Culex</i>)
Vehicle	None
Incubation Period	5m - 18m (range 1m - 2y)
Diagnostic Tests	Identification of microfilariae in nocturnal blood specimen. Nucleic acid amplification. Serology may be helpful.
Typical Adult Therapy	Diethylcarbamazine : 50 mg day 1 50 mg TID day 2 100 mg TID day 3 Then 2 mg/kg TID X 18 days. OR Ivermectin 200ug/kg PO as single dose. Doxycycline 200 mg daily X 8 w is also effective.
Typical Pediatric Therapy	As for adult
Clinical Hints	Lymphangitis, lymphadenitis and eosinophilia Epididymitis, orchitis, hydrocoele or progressive edema are common Chyluria occasionally encountered Episodes of fever and lymphangitis may recur over several years
Synonyms	Bancroftian filariasis, Rosetta leg, Wuchereria bancrofti. ICD9: 125.0 ICD10: B74.0

Filariasis - Bancroftian in Madagascar

Time and Place:

Bancroftian filariasis endemic to the eastern coastal zone

- The disease in Madagascar is nocturnally periodic
- 87.0% of the population are at risk for Bancroftian filariasis as of 2000.



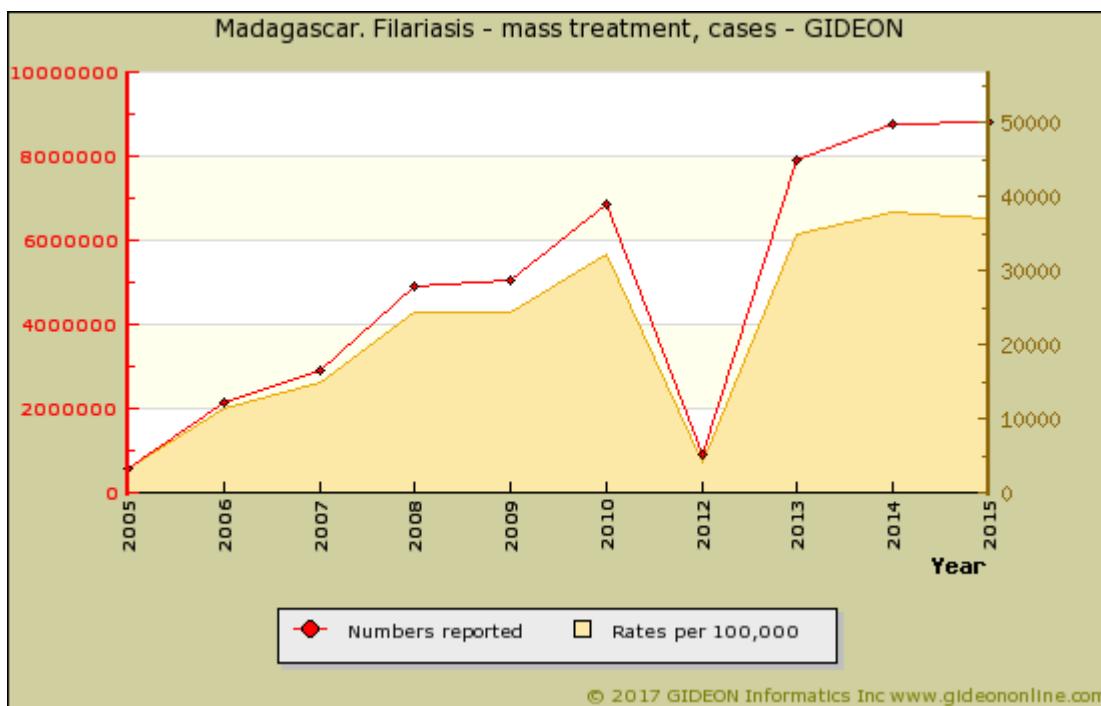
Graph: Madagascar. Filariasis - targeted for MDA, cases

Notes:

1. Number of persons targeted for mass treatment.
2. Additional references: 2008 ¹ 2010 ²

Prevalence surveys

Years	Region	Study Group	%	Notes
	multiple locations	adults	2-14.7	14.7% of men and 2% of women in the eastern coast and southwest
1995 - 1996	multiple locations	general population	22.9	22.9% of individuals in the eastern coast and southwest ³
1995 - 1997	multiple locations	general population	0-4	0% in Marovoay and 4% in Ankazoabo ⁴
1995 - 1997	multiple locations	general population	33	33% in the southeastern districts of Ifanadiana, Manakara and Vangaindrano ⁵
2001 - 2001	Lower Shire Valley	general population	22.2	22.2% to 79.1% in the Lower Shire Valley



Graph: Madagascar. Filariasis - mass treatment, cases

Notes:

1. Additional references: 2005 ⁶ 2006 ⁷ 2007 ⁸ 2008 ⁹ 2010 ¹⁰

Vectors:

The local vectors are *Anopheles funestus*, *An. arabiensis*, *An. gambiae*, *An. pauliani* and *Culex quinquefasciatus*.
 • *An. funestus* is the predominant vector in the Lower Shire Valley.

References

1. Wkly Epidemiol Rec 2009 Oct 09;84(42):437-44.
2. Wkly Epidemiol Rec 2011 Aug 26;86(35):377-88.
3. Arch Inst Pasteur Madagascar 1996 ;63(1-2):16-8.
4. Med Trop (Mars) 2000 ;60(2):141-5.
5. Med Trop (Mars) 2000 ;60(2):141-5.
6. Wkly Epidemiol Rec 2006 Jun 2;81(22):221-32.
7. Wkly Epidemiol Rec 2007 Oct 19;82(42):361-80.
8. Wkly Epidemiol Rec 2008 Sep 12;83(37):333-41.
9. Wkly Epidemiol Rec 2009 Oct 09;84(42):437-44.
10. Wkly Epidemiol Rec 2011 Aug 26;86(35):377-88.

Fungal infection - invasive

Agent	FUNGUS. Various (major syndromes such as Candidiasis, Blastomycosis, etc are discussed separately in this module)
Reservoir	Human
Vector	None
Vehicle	Endogenous, Respiratory or pharyngeal acquisition
Incubation Period	Variable
Diagnostic Tests	Culture of blood, urine, biopsy material. Serum antigen or antibody assay in some cases.
Typical Adult Therapy	Antifungal agent(s) directed at known or likely pathogen
Typical Pediatric Therapy	As for adult
Clinical Hints	A fungal etiology should be suspected in any patient with evidence of severe local or multisystem infection, particularly in the setting of immune suppression.
Synonyms	Acremonium, Acrophialophora, Adiaspiromycosis, Allescheriasis, Alternaria, Arthrographis kalrae, Athopsis, Aureobasidium, Bipolaris, Blastobotrys proliferans, Chaetomium, Chrysosporium, Cladophialophora, Cladosporium, Curvularia, Cyphellophora, Dactylaria, Debaryomyces, Dreschslera, Emmonsia, Exophiala, Exserohilum, Fonsecaea, Fungal meningitis, Fungal sepsis, Fusarium, Geosmithia, Geosmithia argillacea, Geotrichosis, Graphium, Hansenula, Haplomycosis, Hendersonula, Humicola, Hyalophycomycosis, Kluyveromyces, Lasiodiplodia, Lasiodiplodia, Lecythophora, Magnusiomyces, Malassezia furfur, Monascus, Monosporiosis, Mycocentrospora, Neocosmospora vasinfecta, Neosartorya hiratsukae, Neosartorya udagawae, Ochroconis, Oidioidendron, Paecilomyces, Paraconiothyrium, Pestalotiopsis, Phaeoacremonium, Phaeohyphomycosis, Phialemoniopsis, Phialophora, Phoma, Pichia, Pseudallescheria, Pseudallescheriasis, Pseudochaetosphaeronema martinelli, Purpureocillium, Pyrenophaeta, Ramichloridium, Rhinocladiella, Rhytidhysteron, Saccharomyces, Saprochaete, Sarcopodium, Sarocladium, Scedosporium, Septicemia - fungal, Taeniolella, Thielavia, Trichoderma, Truncatella, Ulocladium, Veronacea, Verruconis, Wallemia. ICD9: 117.6,117.8,117.9,118 ICD10: B43.1,B43.2,B43.8,B48.2,B48.3,B48.7,B48.8

Gastroenteritis - viral

Agent	VIRUS - RNA Calicivirus (Norwalk, Hawaii, Sapporo, Snow Mountain, Norovirus); Torovirus; or Astrovirus
Reservoir	Human
Vector	None
Vehicle	Food, Water, Shellfish, Vegetables
Incubation Period	Norwalk 1d - 2d; Astrovirus 3d - 4d
Diagnostic Tests	Demonstration of virus (electron microscopy or stool antigen analysis). Serology. Nucleic acid amplification.
Typical Adult Therapy	Stool precautions; supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Vomiting (less common with Astrovirus) and abdominal pain Loose, watery diarrhea lasting 1 to 3 days Fecal leucocytes not present Fever in 50%; and headache or myalgia in some cases.
Synonyms	Aichi, Astroviridae, Astrovirus, Bufavirus, Calicivirus gastroenteritis, Chiba, Cosavirus, Cyclovirus, Diarrhea, Gastroenterite virale, Hawaii agent gastroenteritis, Klassevirus, Mexico virus, Mini-reovirus, Minireovirus, Norovirus gastroenteritis, Norwalk agent gastroenteritis, Norwalk-like, Parkville virus gastroenteritis, Picobirnavirus, Recovirus, Roskilde disease, Saffold Cardiovirus, Salivirus, Salivirus, Sapovirus, Sapporo, Sapporo-like, Snow Mountain, SRSV gastroenteritis, STL polyomavirus, STLPyV, Toronto virus, Torovirus, Tusaviruses, Vinterkraksjuka, Viral gastroenteritis, Winter vomiting disease. ICD9: 008.8,008.69,008.62,008.63,008.64,008.65,008.66,008.67 ICD10: A08.1,A08.2,A08.3,A08.4

Gastroenteritis - viral in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
2004 - 2005	Antananarivo	children	5.9	Noroviruses are found in 5.9% of children with acute gastroenteritis ¹
2004 - 2005	Antananarivo	children	2.1	Astroviruses are found in 2.1% of children with gastroenteritis ²

References

1. [Emerg Infect Dis 2007 Jun ;13\(6\):908-11.](#)
2. [Emerg Infect Dis 2008 May ;14\(5\):844-6.](#)

GB virus C infection

Agent	VIRUS - RNA. Flaviviridae, Pegivirus GB virus C (Hepatitis G virus)
Reservoir	Human
Vector	None
Vehicle	Blood, Vertical transmission, Sexual contact suspected
Incubation Period	Unknown
Diagnostic Tests	Serology. Nucleic acid amplification.
Typical Adult Therapy	Supportive. Alpha interferon has been shown to ? transiently eliminate the carrier state
Typical Pediatric Therapy	As for adult
Clinical Hints	Acute or chronic hepatitis acquired from blood (needles, etc) Clinically milder than hepatitis C Most cases limited elevation of hepatic enzyme levels, without jaundice Viremia has been documented for as long as 10 years
Synonyms	Epatite G, GBV-C, Hepatitis G, Hepatitis GB, HPgV, HPgV-2, Human Pegivirus. ICD9: 070.59 ICD10: B17.8

Gianotti-Crosti syndrome

Agent	UNKNOWN
Reservoir	Unknown
Vector	None
Vehicle	Unknown
Incubation Period	Unknown
Diagnostic Tests	Clinical features and skin biopsy findings.
Typical Adult Therapy	None
Typical Pediatric Therapy	None
Clinical Hints	History of recent viral illness or vaccination Generalized skin eruption involving the extremities, face and buttocks Lymphadenopathy of the axillae and inguinal region Anicteric hepatitis may occur Illness resolves in 15 to 42 days Rare outbreaks have been reported
Synonyms	Acrodermatitis papulosa infantilis, Papular acrodermititis of childhood, Papulovesicular acrolocated syndrome. ICD9: 693.0 ICD10: L27.8

Giardiasis

Agent	PARASITE - Protozoa. Sarcomastigophora, Metamonada, Trepomonadea. Flagellate: <i>Giardia lamblia</i> (<i>G. intestinalis</i> , <i>G. duodenalis</i>)
Reservoir	Human, Beaver, Muskrat, Dog, Cat, Carnivores, Sheep, Goat, Horse, Cattle
Vector	None
Vehicle	Food, Water, Fecal-oral, Fly
Incubation Period	1w - 3w (range 3d - 6w)
Diagnostic Tests	String test (gelatin capsule containing string). Stool microscopy or antigen assay. Nucleic acid amplification.
Typical Adult Therapy	Tinidazole 2 g PO X1. OR Nitazoxanide 500 mg PO BID X 3d Alternatives: Metronidazole 250 mg PO TID X 5d. OR Furazolidone 100 mg PO QID X 7d. OR Paromomycin 10 mg/kg PO TID X 7d OR Quinacrine 100 mg PO TID X 5d
Typical Pediatric Therapy	Tinidazole 50 mg PO X 1 (maximum 2g). OR Nitazoxanide : Age 1 to 3y 100 mg BID X 7 d Age 4 to 11y 200 mg BID X 7d Alternatives: Metronidazole 5 mg/kg PO TID X 5d. OR Furazolidone 1.5 mg/kg QID X 7d
Clinical Hints	Foul smelling, bulky diarrhea, nausea and flatulence Upper abdominal pain is common Illness may "wax and wane" Weight loss and low-grade fever are common Severe or intractable infection may suggest underlying IgA deficiency
Synonyms	Beaver fever, Giardia duodenalis, Giardia intestinalis, Giardia lamblia, Lambliasis. ICD9: 007.1 ICD10: A07.1

Gonococcal infection

Agent	BACTERIUM. <i>Neisseria gonorrhoeae</i> An aerobic gram-negative coccus
Reservoir	Human
Vector	None
Vehicle	Sexual, contact, Childbirth, Exudates, Respiratory or pharyngeal acquisition
Incubation Period	2d - 7d
Diagnostic Tests	Smear (male), culture. Consult laboratory for proper acquisition & transport. Nucleic acid amplification.
Typical Adult Therapy	Ceftriaxone 250 mg IM X 1. PLUS Azithromycin 1 g PO as single dose.
Typical Pediatric Therapy	Weight <=45 kg: Ceftriaxone 25 - 50 mg/kg IM or IV X 1 (max. 125 mg IM) Weight >45 kg: as for adult. PLUS Azithromycin
Clinical Hints	Copious urethral discharge (male) or cervicitis beginning 2 to 7 days after sexual exposure Pelvic inflammatory disease Systemic disease associated with fever, painful pustules and suppurative arthritis (primarily encountered in postmenstrual females)
Synonyms	Blennorragie, Blenorragia, Gonococcemia, Gonore, Gonorre, Gonorrhea, Gonorrhoea, Gonorrhoe, Gonorrhoe, Infeccion gonococica, Infeccoes gonococicas, Neisseria gonorrhoeae. ICD9: 098 ICD10: A54

Gonococcal infection in Madagascar

Prevalence surveys

Years	Study Group	%	Notes
2009*	sex workers	27	27% of CSW ¹

* indicates publication year (not necessarily year of survey)

References

1. Med Mal Infect 2009 Dec ;39(12):909-13.

Granuloma inguinale

Agent	BACTERIUM. <i>Klebsiella granulomatis</i> (formerly <i>Calymmatobacterium granulomatis</i>) A gram-negative bacillus
Reservoir	Human
Vector	None
Vehicle	Sexual, contact, Direct contact
Incubation Period	7d - 30d (range 3d - 1 year)
Diagnostic Tests	Identification of organism in stained smears. Culture in specialized laboratories (HEp-2 cells).
Typical Adult Therapy	Azithromycin 1 g weekly X 3 w. Alternatives: Doxycycline 100 mg BID PO X 3w. Sulfamethoxazole / Trimethoprim 800/160 mg BID X 3w Erythromycin 500 mg QID X 3w.
Typical Pediatric Therapy	Azithromycin 10 mg / kg po day 1; then 250 mg / kg daily days 2 to 5 Alternatives: Sulfamethoxazole / Trimethoprim , Erythromycin or Doxycycline
Clinical Hints	Slowly expanding, ulcerating skin nodule with friable base Usually painless May be complicated by edema or secondary infection Rarely spreads to bone or joints
Synonyms	Calymmatobacterium granulomatis, Donovanosis, Granuloma genitoinguinale, Granuloma inguinale tropicum, Granuloma venereum, Sixth venereal disease. ICD9: 099.2 ICD10: A58

Hantaviruses - Old World

Agent	VIRUS - RNA. Bunyaviridae, Hantavirus - Old world : Hantaan, Puumala, Dobrava/Belgrade, Saaremaa & Seoul viruses
Reservoir	Field mouse (<i>Apodemus agrarius</i> -Hantaan), Vole (<i>Myodes glareolus</i> -Puumala), Rat (<i>Rattus norvegicus</i> -Seoul), Bat, Bird
Vector	None
Vehicle	Animal excreta, Respiratory or pharyngeal acquisition
Incubation Period	12d - 21d (range 4d - 42d)
Diagnostic Tests	Serology. Viral culture. Nucleic acid amplification. Biosafety level 3.
Typical Adult Therapy	Supportive. Suggest Ribavirin : 1g IV q6h X 4d, then 0.5g q6h X 6d
Typical Pediatric Therapy	Supportive. Suggest Ribavirin
Vaccine	Hantavirus vaccine
Clinical Hints	Headache, backache, myalgia, diarrhea, vomiting, conjunctivitis Hemorrhage and azotemia Proteinuria and thrombocytopenia are common History of local rodent infestation may be elicited Case-fatality rates 0.1% (Puumala virus) to 15% (Belgrade virus)
Synonyms	Acute epidemic hemorrhagic fever, Bosnian hemorrhagic fever, Churilov disease, Dobrava/Belgrade, Endemic benign nephropathy, Epidemic hemorrhagic fever, Far eastern hemorrhagic fever, Haemorrhagic nephrosonephritis, Hantaan, Hemorrhagic fever & renal syndrome, Infectious hemorrhagic fever, Khabarovsk, Korean hemorrhagic fever, Mouse fever, Muju, Murid virus nephropathy, Nephropathia epidemica, Puumala, Rodent-borne viral nephropathy, Saaremaa, Scandinavian epidemic nephropathy, Sangassou, Seoul, Sochi virus, Songo fever, Sorkfeber, Thailand virus, Thottapalayam, Topografov, Tula, Viral hemorrhagic fever, Viral hemorrhagic fevers. ICD9: 078.6 ICD10: A98.5

Hendra virus disease

Agent	VIRUS - RNA. Paramyxoviridae, Megamyxovirus (Henipavirus): Hendra virus
Reservoir	Horse, Fruit bat (<i>Pteropus</i> sp.), Dog, Cat, Guinea pig
Vector	Unknown
Vehicle	Unknown, Possibly urine and secretions, Respiratory or pharyngeal acquisition
Incubation Period	5d - 14d
Diagnostic Tests	Serology & viral isolation (Australia Dept. Health, Canberra). Nucleic acid amplification. Biosafety level 4.
Typical Adult Therapy	Ribavirin (investigational)
Typical Pediatric Therapy	As for adult
Clinical Hints	Follows close contact with horses Pneumonia or "flu-like illness" Headache, vertigo and respiratory distress Giant cell infiltrate in lung tissue
Synonyms	Bat paramyxovirus, Equine morbillivirus, Hendra, Menangle. ICD9: 078.89 ICD10: B33.8

Although Hendra virus disease is not endemic to Madagascar, imported, expatriate or other presentations of the disease have been associated with this country.

Hendra virus disease in Madagascar

Seropositive pteropid bats (*Pteropus rufus* and *Eidolon dupreanum*) have been identified in Madagascar.

Hepatitis A

Agent	VIRUS - RNA. Picornaviridae, Hepatovirus: Hepatitis A virus
Reservoir	Human, Non-human primate
Vector	None
Vehicle	Fecal-oral, Food, Water, Milk, Fly, Breastfeeding
Incubation Period	21d - 30d (range 14d - 60d)
Diagnostic Tests	Serology. Nucleic acid amplification.
Typical Adult Therapy	Stool precautions; supportive
Typical Pediatric Therapy	As for adult
Vaccines	Hepatitis A vaccine Hepatitis A + Hepatitis B vaccine Immune globulin
Clinical Hints	Vomiting, anorexia, dark urine, light stools and jaundice Rash and arthritis occasionally encountered Fulminant disease, encephalopathy and fatal infections are rare Case-fatality rate 0.15% to 2.7%, depending on age
Synonyms	Botkin's disease, Epatite A, HAV, Hepatite per virus A, Infectious hepatitis, Sosuga. ICD9: 070.0 ICD10: B15.0, B15.9

Hepatitis A in Madagascar

Seroprevalence surveys

Years	Region	Study Group	%	Notes
1993		general population	94.9	94.9% of the rural population (1993) ¹
2004	Antananarivo	general population	92.2	92.2% of individuals in Antananarivo (2004) ²

References

1. [Bull Soc Pathol Exot 1994 ;87\(3\):138-42.](#)
2. [BMC Infect Dis 2008 Jun 06;8:78.](#)

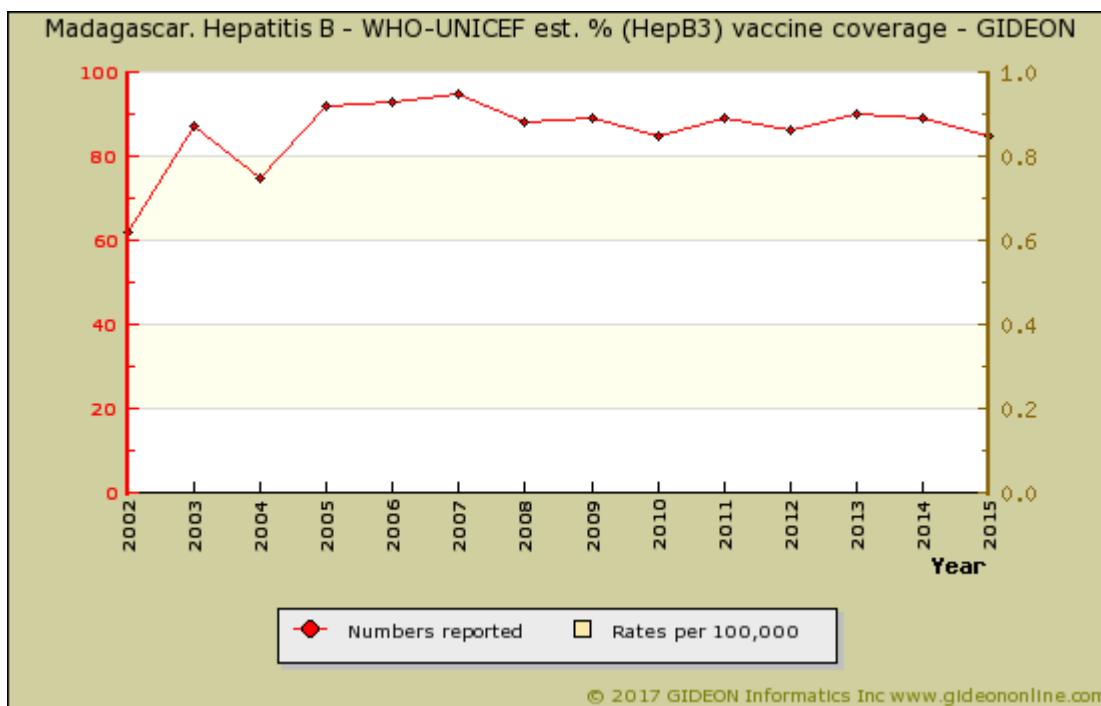
Hepatitis B

Agent	VIRUS - DNA. Hepadnaviridae, Orthohepadnavirus: Hepatitis B virus
Reservoir	Human Non-human primate
Vector	None
Vehicle	Blood, Infected secretions, Sexual contact, Transplacental
Incubation Period	2m - 3m (range 1m - 13m)
Diagnostic Tests	Serology. Nucleic acid amplification.
Typical Adult Therapy	Needle precautions. For chronic infection: Peginterferon alfa-2a or Peginterferon alfa-2b OR Entecavir OR Tenofovir
Typical Pediatric Therapy	As for adult
Vaccines	Hepatitis A + Hepatitis B vaccine Hepatitis B + Haemoph. influenzae vaccine Hepatitis B immune globulin Hepatitis B vaccine
Clinical Hints	Vomiting and jaundice Rash or arthritis occasionally noted Fulminant and fatal infections are encountered Risk group (drug abuse, blood products, sexual transmission) Hepatic cirrhosis or hepatoma may follow years after acute illness
Synonyms	Epatite B, HBV, Hepatite per virus B, Serum hepatitis. ICD9: 070.1 ICD10: B16.2,B16.9, B16.1

Hepatitis B in Madagascar

Vaccine Schedule:

BCG - birth
 DTwPHibHepB - 6,10,14 weeks
 IPV - 14 weeks
 Measles - 9 months
 OPV - birth; 6,10,14 weeks
 Pneumo conj - 6,10,14 weeks
 Rotavirus - 6,10 weeks
 TT - 1st contact pregnancy; +1, +6 months; +1, +1 year



Graph: Madagascar. Hepatitis B - WHO-UNICEF est. % (HepB3) vaccine coverage

HBsAg-positivity surveys

Years	Region	Study Group	%	Notes
1993		general population	18.9-30.5	18.9% to 30.5% in rural villages (1993) ¹
1996*		general population	20.5	20.5% of the general population - 5.3% in rural areas to 26.0% in urban areas (1996 publication) ²
1999	Mahajanga	general population	14.2	14.2% in Mahajanga (1999) ³
2000*		general population	23	23% of the general population (2000 publication) ⁴
2010*	Northern Region	general population	8.56-8.7	8.7% of individuals in Sirama and 8.56% in Mataipako village (northern region, 2010 publication) ⁵
1995 - 1996	Antananarivo	patients - hepatocellular carcinoma	42	42% of patients with hepatocellular carcinoma (Antananarivo, 1995 to 1996). ⁶
2012	Antananarivo	pregnant women	1.9	1.9% of pregnant women in Antananarivo (2012) ⁷
1979*	Tananarive	various	5.4-50	5.4% of blood donors and 50% of hepatitis patients in Tananarive (1979 publication) ⁸

* indicates publication year (not necessarily year of survey)

References

1. Bull Soc Pathol Exot 1994 ;87(3):138-42.
2. Epidemiol Infect 1996 Aug ;117(1):133-7.
3. Med Trop (Mars) 2000 ;60(2):146-50.
4. Arch Inst Pasteur Madagascar 2000 ;66(1-2):50-4.
5. J Med Virol 2010 Sep ;82(9):1515-26.
6. Arch Inst Pasteur Madagascar 1996 ;63(1-2):62-6.
7. Med Mal Infect 2015 Jan-Feb;45(1-2):17-20.
8. Med Trop (Mars) 1979 Nov-Dec;39(6):685-7.

Hepatitis C

Agent	VIRUS - RNA. Flaviviridae, Hepacivirus: Hepatitis C virus
Reservoir	Human
Vector	None
Vehicle	Blood, Sexual contact, Transplacental
Incubation Period	5w - 10w (range 3w - 16w)
Diagnostic Tests	Serology. Nucleic acid amplification.
Typical Adult Therapy	Needle precautions. For chronic infection: Ledipasvir / Sofusuvir OR Ombitasvir-Paritaprevir-Ritonavir + Dasabuvir + Ribavirin OR Sofusuvir + Simeprevir + Ribavirin (Regimen / Duration dependent on viral genotype)
Typical Pediatric Therapy	Agents recommended for adult disease are not currently licensed for use in children Peginterferon alfa-2b 3 MU/m ² SC x1 weekly AND Ribavirin 15mg/kg
Clinical Hints	Vomiting and jaundice May be history of transfusion or injection within preceding 1 to 4 months Chronic hepatitis and fulminant infections are encountered Hepatic cirrhosis or hepatoma may follow years after acute illness
Synonyms	Epatite C, HCV, Hepatite per virus C, Non-A, non-B parenteral hepatitis. ICD9: 070.2,070.3,070.44,070.51,070.54,070.7 ICD10: B17.1

Hepatitis C in Madagascar

The nationwide carriage rate in 1997 was estimated at 3.30%.

Seroprevalence surveys

Years	Region	Study Group	%	Notes
2012*	Antananarivo	blood donors	0.65	0.65% of first-time blood donors in Antananarivo (2012 publication) 1
1994		general population	1.2	1.2% of the general population (1.6% below age 14, and 8.8% above age 35) (1994) 2
1994*		general population	2.2	2.2% to 5.8% in rural villages (1994 publication) 3
2007*	Antananarivo	general population	1.7	1.7% of individuals in Antananarivo (2007 publication) 4
2008*	Antananarivo	general population	1.2	1.2% of individuals in urban areas of Antananarivo (2008 publication) 5
1995 - 1996		patients - hepatocellular carcinoma	11	11% of patients with hepatocellular carcinoma (1995 to 1996) 6

* indicates publication year (not necessarily year of survey)

References

1. [Transfus Clin Biol](#) 2012 Apr ;19(2):52-6.
2. [Bull Soc Pathol Exot](#) 1997 ;90(1):3-5.
3. [Bull Soc Pathol Exot](#) 1994 ;87(3):138-42.
4. [J Med Virol](#) 2007 Aug ;79(8):1082-8.
5. [BMC Infect Dis](#) 2008 Feb 29;8:25.
6. [Arch Inst Pasteur Madagascar](#) 1996 ;63(1-2):62-6.

Hepatitis D

Agent	VIRUS - RNA. Deltavirus: Hepatitis D virus - a 'satellite' virus which is encountered as infection with a co-virus (Hepatitis B)
Reservoir	Human
Vector	None
Vehicle	Infected secretions, Blood, Sexual contact
Incubation Period	4w - 8w (range 2w - 20w)
Diagnostic Tests	Serology. Nucleic acid amplification.
Typical Adult Therapy	Needle precautions; supportive <i>Interferon alfa 2-a</i> has been used.
Typical Pediatric Therapy	As for adult
Clinical Hints	Vomiting and jaundice Biphasic course often noted Occurs as a coinfection or superinfection of hepatitis B May be chronic or fulminant (prognosis of combined hepatitis B and delta is worse than reported for hepatitis B alone).
Synonyms	Epatite D, Hepatitis delta. ICD9: 070.41,070.52 ICD10: B17.0

Hepatitis E

Agent	VIRUS - RNA. Caliciviridae: Hepatitis E virus
Reservoir	Human, Rodent, Pig
Vector	None
Vehicle	Fecal-oral, Water, Shellfish, Blood, Meat
Incubation Period	30d - 40d (range 10d - 70d)
Diagnostic Tests	Identification of virus by immune electron microscopy (stool). Serology. Nucleic acid amplification.
Typical Adult Therapy	Stool precautions; supportive Ribavirin has been used successfully in high-risk patients.
Typical Pediatric Therapy	As for adult
Vaccine	Hepatitis E vaccine
Clinical Hints	Clinically similar to hepatitis A Chronic residua are rare Severe or fatal if acquired during pregnancy (10% to 24% case-fatality rate).
Synonyms	Epatite E, Non-A, non-B enteric hepatitis. ICD9: 070.43,070.53 ICD10: B17.2

Hepatitis E in Madagascar

Prevalence surveys

Years	Study Group	%	Notes
2008 - 2010	pigs	1.2	1.2% of pig livers (2008 to 2010) ¹

Seroprevalence surveys

Years	Study Group	%	Notes
2008 - 2010	various	14.1-71.2	14.1% of slaughterhouse workers and 71.2% of pigs (2008 to 2010) ²

References

1. [Am J Trop Med Hyg](#) 2013 Feb ;88(2):329-38.
2. [Am J Trop Med Hyg](#) 2013 Feb ;88(2):329-38.

Herpes B infection

Agent	VIRUS - DNA. Herpesviridae, Alphaherpesviridae, Simplexvirus: Cercopithecine herpesvirus 1 (Herpes B virus)
Reservoir	Monkey (<i>Macaca species</i> and <i>Cynomolgus</i>)
Vector	None
Vehicle	Contact or bite, Respiratory or pharyngeal acquisition
Incubation Period	10d - 20d (range 2d - 60d)
Diagnostic Tests	Viral culture (skin exudates). Nucleic acid amplification. Biosafety level 4.
Typical Adult Therapy	Therapy: Acyclovir 12 mg/kg IV q8h. OR Ganciclovir 5 mg/kg IV q12h. Follow with prolonged Acyclovir 800 mg PO 5X daily. Postexposure prophylaxis: Valacyclovir 1g PO q8h X 14 days. OR Acyclovir 800 mg PO X 5 X 14 days
Typical Pediatric Therapy	Acyclovir or Ganciclovir as for adult.
Clinical Hints	Skin vesicles, lymphadenopathy, myalgia, singultus, major neurological signs Usually onset within one month of contact with monkey Case-fatality rates exceed 80% Permanent neurological residua are common
Synonyms	Cercopithecine herpesvirus 1, Herpes B, Herpesvirus simiae, Macacine herpesvirus 1. ICD9: 078.89 ICD10: B00.4

Herpes simplex encephalitis

Agent	VIRUS - DNA. Herpesviridae, Alphaherpesvirinae, Simplexvirus: Human herpesvirus (usually type I)
Reservoir	Human
Vector	None
Vehicle	Infected secretions, Sexual contact
Incubation Period	Unknown
Diagnostic Tests	Viral culture CSF usually negative. CT brain. Compare CSF/blood antibody levels. Nucleic acid amplification.
Typical Adult Therapy	Acyclovir 10 mg/kg IV Q8h
Typical Pediatric Therapy	Acyclovir 10 mg/kg IV Q8h
Clinical Hints	Rapidly-progressive severe encephalitis Exanthem not evident in most cases Often unilateral, with temporal and parietal lobe predominance Permanent residua and high case-fatality rate in untreated cases
Synonyms	

Herpes simplex infection

Agent	VIRUS - DNA. Herpesviridae, Alphaherpesvirinae, Simplexvirus: Human herpesvirus I and II
Reservoir	Human
Vector	None
Vehicle	Infected secretions, Sexual contact, Breastfeeding, Respiratory or pharyngeal acquisition
Incubation Period	1d - 14d
Diagnostic Tests	Viral culture or microscopy of lesions. Serology. Nucleic acid amplification.
Typical Adult Therapy	Famciclovir 250 mg PO TID X 7d. OR Valacyclovir 1 g PO BID X 7d OR Acyclovir 400 mg PO X 3 per day X 7d Dosage and duration may vary for first vs. recurrent vs. suppressive regimens.
Typical Pediatric Therapy	Acyclovir 10 mg/kg PO QID X 7 d
Clinical Hints	Recurring localized crops of painful vesicles on a red base Regional adenopathy often present May follow a prodrome of neuropathy or hyperesthesia
Synonyms	Herpes gladiatorum, Herpes rugbiorum, Herpes simplex, Scrum pox. ICD9: 054.0,054.1,054.2,054.4,054.5,054.6,054.7,054.8,054.9 ICD10: A60,B00

Herpes simplex infection in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
1999*	Antananarivo	patients - STD	10	10% of genital ulcers seen in venereal disease clinics (Antananarivo, 1999 publication) ¹
2005*		patients - STD	28-49	49% of female and 28% of male STD patients (HSV-2, 2005 publication) ²

* indicates publication year (not necessarily year of survey)

References

1. J Infect Dis 1999 Oct ;180(4):1382-5.
2. Sex Transm Dis 2005 Mar ;32(3):150-5.

Herpes zoster

Agent	VIRUS - DNA. Herpesviridae, Alphaherpesvirinae: Varicella-zoster virus
Reservoir	Human
Vector	None
Vehicle	Air, Direct contact
Incubation Period	Unknown
Diagnostic Tests	Viral culture (vesicles). Serology. Nucleic acid amplification.
Typical Adult Therapy	Acyclovir 800 mg PO X 5 daily X 7 to 10d. OR Famciclovir 500 PO TID. OR Valacyclovir 1 g PO TID
Typical Pediatric Therapy	Acyclovir 20 mg/kg PO QID X 7 to 10d
Vaccine	Herpes zoster vaccine
Clinical Hints	Patients usually above age 50 Unilateral dermatomal pain, tenderness and paresthesia Rash appears after 3 to 5 days - macular, erythematous lesions which evolve into vesicles Trunk and chest wall most commonly involved, but other areas possible Recurrence is common
Synonyms	Fuocodi Saint'Antonio, Shingles, Zona, Zoster. ICD9: 053 ICD10: B02

Histoplasmosis - African

Agent	FUNGUS. Ascomycota, Euascomycetes, Onygenales: <i>Histoplasma capsulatum</i> var. <i>duboisii</i> A dimorphic fungus
Reservoir	Bat, Chicken, Baboon, Bird
Vector	None
Vehicle	Air
Incubation Period	Unknown
Diagnostic Tests	Fungal culture or biopsy.
Typical Adult Therapy	Amphotericin B ; or Ketoconazole
Typical Pediatric Therapy	As for adult
Clinical Hints	Skin nodule, abscess or ulcer Underlying bone lesions (skull, femur and ribs) are common Lesions may be multiple and associated with lymphadenopathy and weight loss
Synonyms	African histoplasmosis. ICD9: 115.1 ICD10: B39.5

Histoplasmosis - African in Madagascar

Sporadic case reports are published. [1](#) [2](#) [3](#) [4](#)

Notable outbreaks

Years	Cases	Population	Notes
2011	9	scientists	Outbreak was reported among researchers studying in Uganda - from Austria, Madagascar, the Netherlands, Poland, South Africa, Sweden, Switzerland and the United Kingdom (2 cases). 5

References

- 1. Indian J Chest Dis Allied Sci 2000 Oct-Dec;42(4):271-7.
- 2. Rev Iberoam Micol 1997 Dec ;14(4):155-9.
- 3. Arch Inst Pasteur Madagascar 1989 ;56(1):169-74.
- 4. Bull Soc Pathol Exot Filiales 1982 Aug-Oct;75(4):400-3.
- 5. ProMED <promedmail.org> archive: 20110908.2738

HIV infection - initial illness

Agent	VIRUS - RNA. Retroviridae, Lentivirinae: Human Immunodeficiency Virus
Reservoir	Human
Vector	None
Vehicle	Blood, Semen, Sexual contact, Transplacental, Breastfeeding
Incubation Period	1w - 6w
Diagnostic Tests	HIV antibody (ELISA, Western blot). HIV or HIV antigen assays. Nucleic acid amplification.
Typical Adult Therapy	Antiretroviral therapy - most experts will initiate treatment even if no symptoms + normal CD4 count.
Typical Pediatric Therapy	Antiretroviral therapy - most experts will initiate treatment even if no symptoms + normal CD4 count.
Clinical Hints	Fever, diarrhea, sore throat and a mononucleosis-like illness Most common among "high risk" patients (illicit drug use, commercial sex work, men who have sex with men, etc).
Synonyms	HIV, HIV infection, HTLV-III infection. ICD9: 042 ICD10: B20,B21,B22,B23,B24

HIV infection - initial illness in Madagascar

Data and background information regarding HIV infection are included in the note for **HIV/AIDS**

References

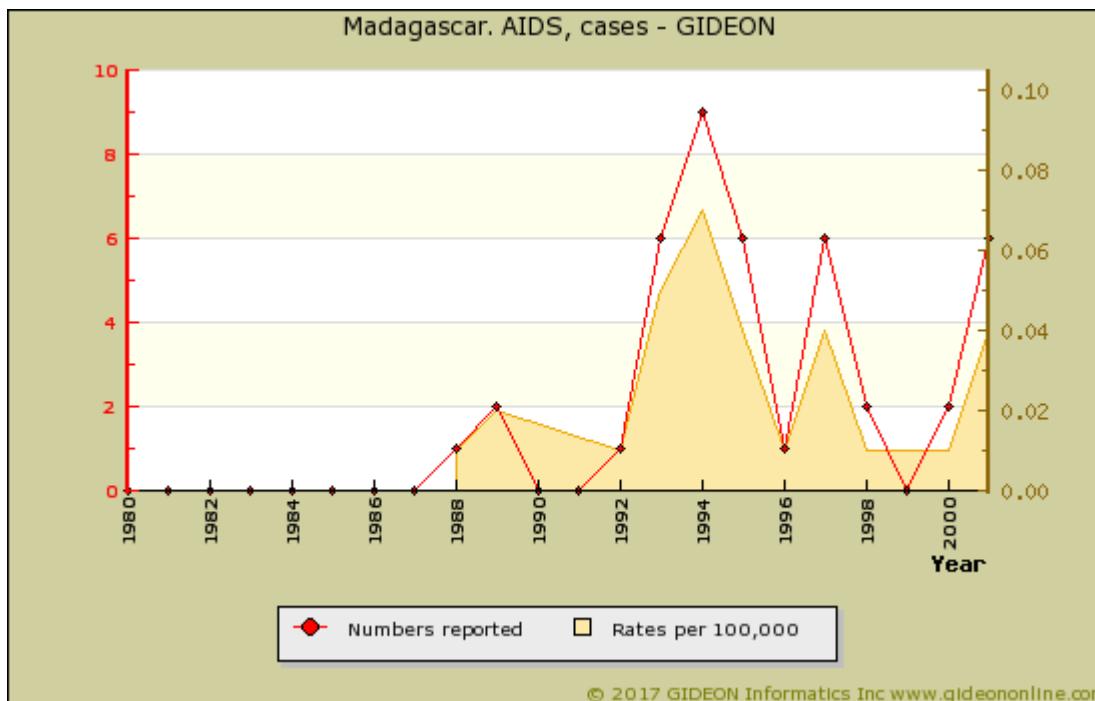
1. Bull Soc Pathol Exot 1998 ;91(1):68-70.
2. Trop Med Int Health 2003 Jan ;8(1):60-6.
3. Med Mal Infect 2009 Dec ;39(12):909-13.
4. Sex Transm Dis 2005 Mar ;32(3):150-5.

HIV/AIDS

Agent	VIRUS - RNA. Retroviridae, Lentivirinae: Human Immunodeficiency Virus, HIV
Reservoir	Human
Vector	None
Vehicle	Blood, Semen, Sexual, Transplacental, Breastfeeding
Incubation Period	2m - 10y (50% within 10y)
Diagnostic Tests	HIV antibody (ELISA, Western blot). Nucleic acid amplification. Tests for HIV antigen & viral load as indicated.
Typical Adult Therapy	Nucleoside/-nucleotide reverse transcriptase inhibitor + A Non-nucleoside reverse transcriptase inhibitor OR a Protease Inhibitor OR a Strand-transfer integrase inhibitor
Typical Pediatric Therapy	Regimens vary - in general: 2 Non-nucleoside reverse transcriptase inhibitors + Ritonavir / Lopinavir OR Nevirapine OR Atazanavir
Clinical Hints	Most often associated with drug abuse, blood products, men who have sex with men, hemophilia Severe and multiple episodes of infection (herpes simplex, moniliasis, candidiasis, etc) Chronic cough, diarrhea, weight loss, lymphadenopathy, retinitis, encephalitis or Kaposi's sarcoma
Synonyms	AIDS, ARC, Gay cancer, GRID, HIV-1, HIV-2, HIV-AIDS, SIDA, Slim disease. ICD9: 042 ICD10: B20,B21,B22,B23,B24

HIV/AIDS in Madagascar

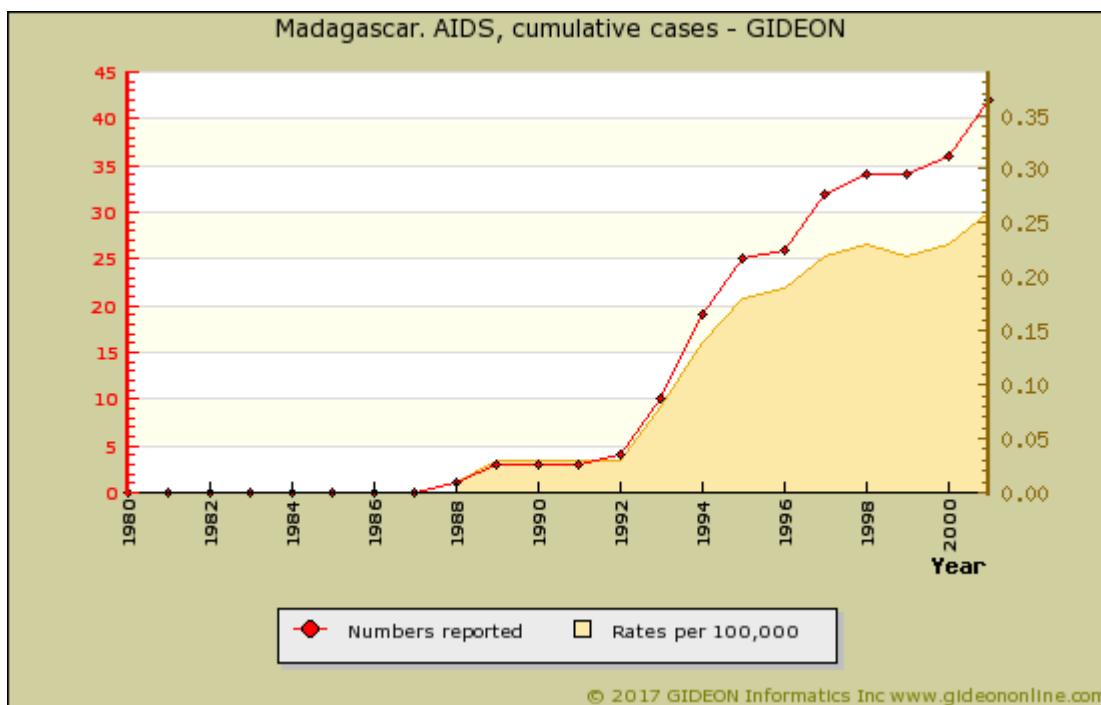
The first case of AIDS was reported in 1988.



Graph: Madagascar. AIDS, cases

Notes:

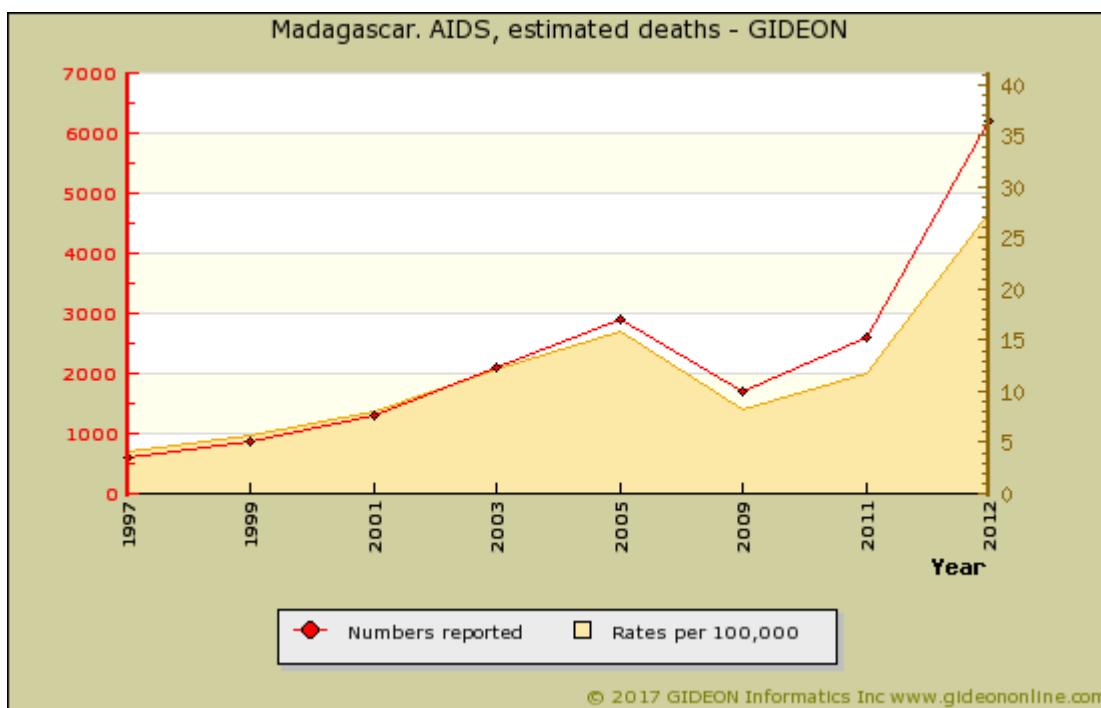
- 1. The true number of AIDS cases to December 1997 is estimated at 2,200, with 1,900 AIDS deaths.



Graph: Madagascar. AIDS, cumulative cases

Demography and risk factors:

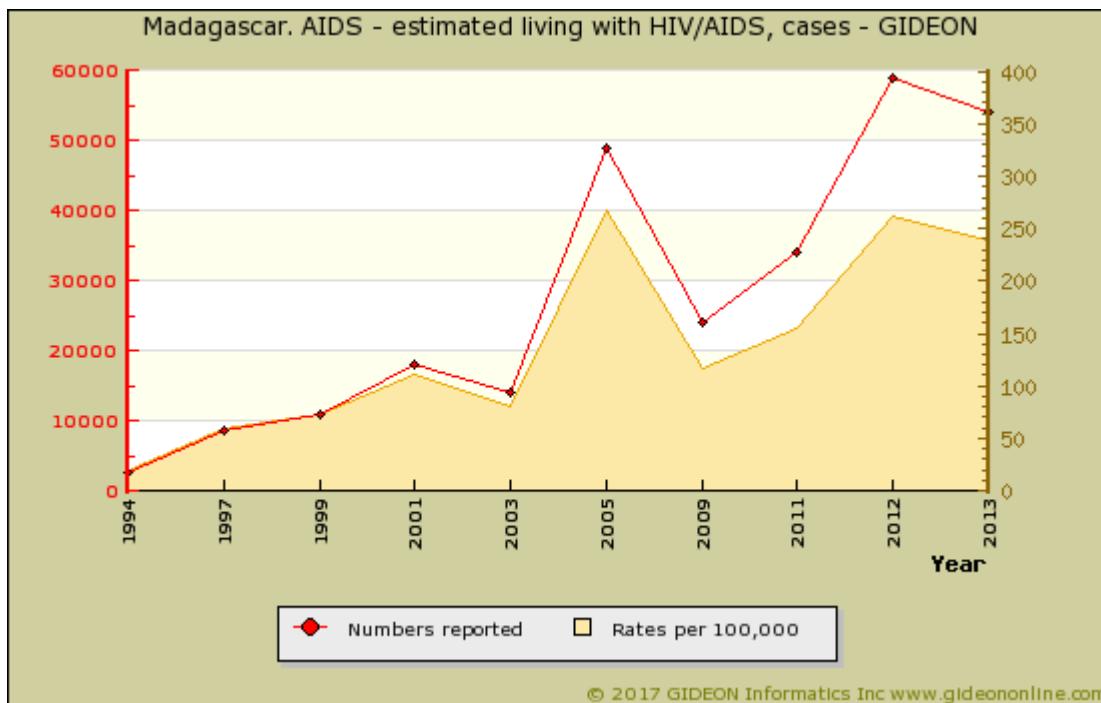
- Cases to March 1998: 91% heterosexual, 5% men who have sex with men and 5% blood-related.
- Cases during 1997 to 2001: 83% ages 15 to 49; 62% males.



Graph: Madagascar. AIDS, estimated deaths

Notes:

1. 2,500 AIDS orphans were estimated to December 1999; 6,300 in 2001.
2. An estimated 8,200 AIDS orphans were alive in 2003; 13,000 in 2005.



Graph: Madagascar. AIDS - estimated living with HIV/AIDS, cases

Notes:

1. Figure for 1997 represented 0.12% of adults ages 15 to 49; 0.3% in 2001; 1.7% in 2003.

Seroprevalence surveys

Years	Region	Study Group	%	Notes
1989 - 1995		adults	0.02-0.07	0.02% of adults in 1989, and 0.07% in 1995 ¹
2008 - 2009		general population	0.1	0.1% of males and 0.1% of females ages 15 to 24 ²
2008 - 2009		men	0.9	0.9% of males ages 15 to 19 years
2003*		men	2.5	2.5% of males living in coastal villages ³
1996		patients - STD	0-0.68	
2005*		patients - STD	0.9	⁴
1996		pregnant women	0-1	
2001		pregnant women	0.3	
2003		pregnant women	1.1	
2010	multiple locations	pregnant women	0	0% of pregnant women in Ambositra, Ifanadiana, Manakara, Mananjary, Moramanga and Tsiroanomandidy ⁵
1996		sex workers	0-1.02	
1998		sex workers	0-1.3	0% (Toliary) to 1.3% (urban) ⁶
2001		sex workers	0.2	

Years	Region	Study Group	%	Notes
2007	Antananarivo	sex workers	0.5	
2009 *		sex workers	0 ⁷	

* indicates publication year (not necessarily year of survey)

References

1. Bull Soc Pathol Exot 1998 ;91(1):68-70.
2. Trop Med Int Health 2012 Jul ;17(7):796-807.
3. Sex Transm Dis 2003 Mar ;30(3):262-5.
4. Sex Transm Dis 2005 Mar ;32(3):150-5.
5. Trop Med Int Health 2013 Jan ;18(1):35-9.
6. Trop Med Int Health 2003 Jan ;8(1):60-6.
7. Med Mal Infect 2009 Dec ;39(12):909-13.

Hookworm

Agent	PARASITE - Nematoda. Secernentea: <i>Necator americanus</i> , <i>Ancylostoma duodenale</i> , <i>A. ceylonicum</i> (in Kolkata and the Philippines)
Reservoir	Human, Non-human primates
Vector	None
Vehicle	Soil, Contact
Incubation Period	7d - 2y
Diagnostic Tests	Examination of stool for ova.
Typical Adult Therapy	Albendazole 400 mg X 1 dose. OR Mebendazole 100 mg BID X 3d. OR Pyrantel pamoate 11 mg/kg (max 3g) X 3d
Typical Pediatric Therapy	Albendazole 200 mg PO single dose OR Mebendazole 100 mg BID X 3 d (> age 2).
Clinical Hints	Pruritic papules, usually on feet Later cough and wheezing Abdominal pain and progressive iron-deficiency anemia Eosinophilia is common Dyspnea and peripheral edema in heavy infections
Synonyms	Anchilostoma, Ancylostoma ceylanicum, Ancylostoma duodenale, Ancylostomiasis, Anquilostomiasis, Cyclodontostomum, Eosinophilis enteritis, Hakenwurmer-Befall, Miner's anemia, Necator americanus, Necator gorillae, Necatoriasis, Uncinariasis. ICD9: 126.0,126.1 ICD10: B76.0,B76.1,B76.8

Hookworm in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
1998*	Southeastern Region	children	27	27% of children in the southeastern region (1998 publication) ¹
1981*	Eastern Region	general population	29.9	29.9% in rural eastern Madagascar (1981 publication) ²

* indicates publication year (not necessarily year of survey)

References

1. *J Parasitol* 1998 Jun ;84(3):480-4.
2. *Arch Inst Pasteur Madagascar* 1981 ;48(1):151-61.

HTLV Infections

Agent	VIRUS - RNA Retroviridae. Deltaretrovirus Human T-lymphotrophic virus I to IV (disease limited to I and II)
Reservoir	Human Non-human primate
Vector	None
Vehicle	Blood, Needles, Semen, Sexualcontact, Transplacental, Breastfeeding, Meat (bush-meat)
Incubation Period	Variable
Diagnostic Tests	Serology Nucleic acid amplification
Typical Adult Therapy	Specific therapy not available. Advanced symptomatic disease has been treated with combinations of Zidovudine and Interferon, Cyclosporine, or anti-neoplastic agents
Typical Pediatric Therapy	As of adult
Clinical Hints	Overt disease is evident in only 1% to 5% of infections Increased susceptibility to pyoderma, sepsis, bronchiectasis Keratoconjunctivitis sicca or uveitis Late development of tropical spastic paraparesis or T-cell leukemia/lymphoma
Synonyms	Adult T-cell leukemia / lymphoma, HTLV-1, HTLV-1/2, HTLV-2, HTLV-4, HTLV-I, HTLV-I/II, HTLV-II, HTLV-IV, Human T-cell lymphotropic virus, Human T-lymphotropic virus, Primate T-lymphotropic virus, PTLV-1, Tropical spastic paraparesis. ICD9: 204.0,208.9 ICD10: C83,C88,G04.1

HTLV Infections in Madagascar

Seroprevalence surveys

Years	Study Group	Notes
1985*	general population	0% of a population from Madagascar (HTLV-1, 1985 publication) ¹

* indicates publication year (not necessarily year of survey)

References

1. [Cancer Res 1985 Sep ;45\(9 Suppl\):4630s-4632s.](#)

Human herpesvirus 6 infection

Agent	VIRUS - DNA. Herpesviridae, Betaherpesvirinae, Roseolovirus: Herpesvirus 6 (Herpesvirus 7 is also implicated)
Reservoir	Human
Vector	None
Vehicle	Droplet, Contact, Respiratory or pharyngeal acquisition
Incubation Period	10d - 15d
Diagnostic Tests	Viral isolation and serologic tests rarely indicated. Nucleic acid amplification has been used
Typical Adult Therapy	Supportive Gancyclovir has been used in unusual and severe cases.
Typical Pediatric Therapy	As for adult
Clinical Hints	High fever followed by sudden defervescence and fleeting rash Most patients are below the age of 2 years Note that only 10% to 20% of Herpesvirus 6 infections are associated with a rash
Synonyms	Dreitagefieber, Exanthem criticum, Exanthem subitum, Herpesvirus 6, HHV-6, Pseudorubella, Roseola, Roseola infantilis, Roseola subitum, Sixth disease, Zahorsky's disease. ICD9: 057.8 ICD10: B08.2

Hymenolepis diminuta infection

Agent	PARASITE - Platyhelminthes, Cestoda. Cyclophyllidea, Hymenolepididae: <i>Hymenolepis diminuta</i>
Reservoir	Rodent, Various insects
Vector	None
Vehicle	Arthropod ingestion
Incubation Period	2w - 4w
Diagnostic Tests	Identification of ova in stool
Typical Adult Therapy	Praziquantel 25 mg/kg as single dose. OR Niclosamide 2g, then 1g/d X 6d
Typical Pediatric Therapy	Praziquantel 25 mg/kg as single dose. OR Niclosamide 1g, then 0.5g/d X 6d (1.5g, then 1g for weight >34kg)
Clinical Hints	Nausea, abdominal pain and diarrhea Eosinophilia may be present Primarily a disease of children, in rodent-infested areas Infestation resolves spontaneously within 2 months
Synonyms	Hymenolepis diminuta, Mathevotaenia, Rat tapeworm. ICD9: 123.6 ICD10: B71.0

Hymenolepis nana infection

Agent	PARASITE - Platyhelminthes, Cestoda. Cyclophyllidea, Hymenolepididae: <i>Hymenolepis (Rodentolepis) nana</i>
Reservoir	Human, Rodent (hamster)
Vector	None
Vehicle	Food, Water, Fecal-oral
Incubation Period	2w - 4w
Diagnostic Tests	Identification of ova in stool
Typical Adult Therapy	Praziquantel 25 mg/kg once. OR Nitazoxanide 500 mg daily for 3 days OR Niclosamide 2g/d X 1, then 1g/d X 6d
Typical Pediatric Therapy	Praziquantel 25 mg/kg once. OR Nitazoxanide 100 mg (age 1 to 3 years) to 200 mg (age 4 to 11 years) BID X 3d OR Niclosamide 1g/d X 1, then 0.5g/d X 6d (1.5g, then 1g for weight >34kg)
Clinical Hints	Nausea, abdominal pain, diarrhea, irritability and weight loss Eosinophilia may be present Condition is maintained by autoinfection (worm reproduces within the intestinal lumen)
Synonyms	Dwarf tapeworm, <i>Hymenolepis nana</i> , <i>Rodentolepis microstoma</i> , <i>Rodentolepis nana</i> , <i>Rodentolepsiasis</i> , <i>Vampirolepis nana</i> . ICD9: 123.6 ICD10: B71.0

Hymenolepis nana infection in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
1996 - 1997	Mahajanga	patients	2.5	2.5% of hospital patients in the Mahajanga region (1996 to 1997) ¹

References

1. Bull Soc Pathol Exot 2003 Mar ;96(1):41-5.

Infection of wound, puncture, IV line, etc

Agent	BACTERIUM. <i>Staphylococcus aureus</i> , streptococci, facultative or aerobic gram negative bacilli, anaerobes, et al
Reservoir	Human, Soil, Water, Air (spores), Various animals and plants
Vector	None
Vehicle	Trauma, Water, Medications, Bandages, Autoinoculation
Incubation Period	Variable
Diagnostic Tests	Smear and culture of catheter, material from wound.
Typical Adult Therapy	Drainage, remove catheter, debridement and antibiotics appropriate to infecting species
Typical Pediatric Therapy	As for adult
Clinical Hints	Source (ie, venous line, postoperative, marine, animal bite) may suggest species Onset within 24 hrs = group A <i>Streptococcus</i> or <i>Cl. perfringens</i> 2 to 7 days = <i>S. aureus</i> More than 7 days = gram negative bacilli Foul odor = anaerobic bacteria
Synonyms	Intravenous catheter infection, Line infection, Surgical wound infection, Wound infection. ICD9: 686.9,451 ICD10: T79.3,I80.0, Y95

Infectious mononucleosis or EBV infection

Agent	VIRUS - DNA. Herpesviridae. Gammaherpesvirinae, Lymphocryptovirus: Human herpesvirus 4 (Epstein Barr virus)
Reservoir	Human
Vector	None
Vehicle	Saliva, Blood transfusion, Breastfeeding, Respiratory or pharyngeal acquisition
Incubation Period	28d - 42d
Diagnostic Tests	Serology. Nucleic acid amplification.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Exudative pharyngitis Symmetrical cervical lymphadenopathy, splenomegaly and hepatic dysfunction Atypical lymphocytes and positive serology appear after 10 to 14 days Acute illness resolves in 2 to 3 weeks, but malaise and weakness may persist for months
Synonyms	EBV, EBV, Epstein-Barr, Febbre ghiandolare, Filatov's disease, Glandular fever, Infectious mononucleosis, Monocytic angina, Mononucleose, Mononucleosi, Mononucleosis - infectious, Mononukleose, Pfeiffer's disease. ICD9: 075 ICD10: B27.0

Influenza

Agent	VIRUS - RNA. Orthomyxoviridae, Orthomyxovirus: Influenza virus
Reservoir	Human, Ferret, Bird, Pig
Vector	None
Vehicle	Droplet, Respiratory or pharyngeal acquisition
Incubation Period	1d - 3d
Diagnostic Tests	Viral culture (respiratory secretions). Serology. Nucleic acid amplification techniques are available.
Typical Adult Therapy	Respiratory precautions. Influenza A or B: Oseltamivir 75 mg PO BID X 5d OR Zanamivir 10 mg BID X 5 days
Typical Pediatric Therapy	Respiratory precautions. Influenza A or B: Oseltamivir 2 mg/kg (max 75 mg) PO BID X 5d OR Zanamivir (age > 5 years) 10 mg BID X 5 days
Vaccines	Influenza - inactivated vaccine Influenza - live vaccine
Clinical Hints	Myalgia, headache, cough and fever Pharyngitis and conjunctivitis often present Usually encountered in the setting of an outbreak Leucocytosis, chest pain and lobar infiltrate herald bacterial (pneumococcal or staphylococcal) pneumonia
Synonyms	Asian flu, Aviaire influenza, Avian flu, Avian influenza, Bird flu, Epidemic catarrh, Grippe, H10N8, H1N1, H2N2, H3N2, H5N1, H7N9, Hong Kong flu, LPAI, Spanish influenza, Swine flu, Swine influenza. ICD9: 487 ICD10: J09,J10,J11

Influenza in Madagascar

GIDEON does not follow routine country reports on human Influenza, since the scope and nature of these data are often diffuse, sporadic or inconsistent. See the "Worldwide" note for material regarding pandemic influenza, influenza vaccine, avian influenza in humans and other relevant subjects.

Notable outbreaks

Years	Region	Cases	Deaths	Pathogen	Notes
2002	Fianarantsoa	30,304	754	H3N2	1
2009 - 2010			3	H1N1	An outbreak was reported. For comprehensive analyses of the H1N1 pdm09 pandemic see the Worldwide note. 2 3 4 5 6 7

References

1. MMWR Morb Mortal Wkly Rep 2002 Nov 15;51(45):1016-8.
2. PLoS One 2012 ;7(5):e37067.
3. Epidemiol Infect 2013 Apr ;141(4):745-50.
4. J Infect Dis 2012 Dec 15;206 Suppl 1:S5-13.
5. J Infect Dis 2012 Dec 15;206 Suppl 1:S140-7.
6. Epidemiol Infect 2013 Nov ;141(11):2454-5.
7. ProMED <promedmail.org> archive: 20091113.3933

Intestinal spirochetosis

Agent	BACTERIUM. <i>Brachyspira pilosicoli</i> and <i>B. aalborgi</i> Anaerobic gram-negative spirochetes
Reservoir	Human, Fowl, Pig
Vector	None
Vehicle	Endogenous
Incubation Period	Unknown
Diagnostic Tests	Spirochetes resemble "brush border" on bowel biopsy; identification of Brachyspira by PCR
Typical Adult Therapy	Metronidazole appears to be effective in some cases.
Typical Pediatric Therapy	As for adult.
Clinical Hints	Chronic diarrhea and abdominal pain in the absence of other identifiable etiology
Synonyms	Human intestinal spirochetosis. ICD9: 009.1 ICD10: A04.8

Intra-abdominal abscess

Agent	BACTERIUM. Mixed anaerobic / aerobic, staphylococci, <i>Neisseria gonorrhoeae</i> , <i>Chlamydia trachomatis</i> , etc
Reservoir	Human
Vector	None
Vehicle	None
Incubation Period	Variable
Diagnostic Tests	Various imaging techniques (CT, Gallium scan, ultrasound, etc).
Typical Adult Therapy	Percutaneous or open drainage + antibiotics directed at known or suspected pathogen(s)
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, chills and localizing pain (e.g., chest pain in subphrenic abscess) Setting of prior surgery, biliary or colonic disease, appendicitis, vaginal discharge (PID) FUO, subdiaphragmatic gas or limited diaphragmatic motion may be present
Synonyms	Abscess - Abdominal, Acute appendicitis, Appendicitis, Intraabdominal abscess, Intraperitoneal abscess, P.I.D., Pancreatic abscess, Pelvic abscess, Pelvic inflammatory disease, Pylephlebitis, Subhepatic abscess, Subphrenic abscess, Suppurative pancreatitis, Tuboovarian abscess. ICD9: 614,577.0 ICD10: K35,N73,K75.1,K85

Intracranial venous thrombosis

Agent	BACTERIUM. Oral anaerobes, streptococci, et al
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Culture (blood, CSF if indicated). Ophthalmoscopy. Roentgenographic studies of skull & sinuses.
Typical Adult Therapy	Antibiotic(s) directed at known or suspected pathogens
Typical Pediatric Therapy	As for adult
Clinical Hints	Headache, seizures and fever Cranial nerve dysfunction may be present Usually occurs in the setting of ongoing facial, otic or sinus infection
Synonyms	Cavernous sinus thrombosis, Cerebral sinus thrombosis, Cortical vein thrombosis, Internal cerebral vein thrombosis, Straight sinus thrombosis, Superior sinus thrombosis, Transverse sinus thrombosis. ICD9: 325 ICD10: G08

Isosporiasis

Agent	PARASITE - Protozoa. Apicomplexa, Eimeriida: <i>Isospora (Cystoisospora) belli</i>
Reservoir	Human
Vector	None
Vehicle	Food, Liquids, Fecal-oral, Sexual (homosexual) contact
Incubation Period	7d - 10d
Diagnostic Tests	Microscopy of stool or duodenal contents. Advise laboratory when this organism is suspected.
Typical Adult Therapy	Sulfamethoxazole / Trimethoprim 800/160 mg BID X 10 days - Then BID X 3 weeks (may be indefinite in AIDS patient) Increase dosage / duration in immune-suppressed patients Pyrimethamine 50 to 75 mg per day + leucovorin if allergic to sulfa
Typical Pediatric Therapy	Sulfamethoxazole / Trimethoprim 25/5 mg/kg BID X 10 days - Then BID X 3 weeks
Clinical Hints	Myalgia, watery diarrhea, nausea and leukocytosis Eosinophilia may be present Illness is prolonged and severe in AIDS patients
Synonyms	<i>Cystoisospora belli</i> , <i>Isospora belli</i> . ICD9: 007.2 ICD10: A07.3

Kawasaki disease

Agent	UNKNOWN
Reservoir	Unknown
Vector	None
Vehicle	Unknown
Incubation Period	Unknown
Diagnostic Tests	Diagnosis is based on clinical criteria only.
Typical Adult Therapy	Intravenous gamma globulin 2.0 g/kg over 10 to 12h X 1 dose. Plus aspirin 100 mg/kg/day X 14d (or until defervescence) - then 5 to 10 mg/kg/day until normal ESR Infliximab 5 mg/kg has been successful in some studies.
Typical Pediatric Therapy	As for adult
Clinical Hints	Disease is most common among children Fever, conjunctivitis, stomatitis and an erythematous rash which desquamates Occasionally complicated by coronary artery occlusion Case-fatality rates of 1% to 4% are reported
Synonyms	Kawasaki's disease, Mucocutaneous lymph node syndrome. ICD9: 446.1 ICD10: M30.3

Kawasaki disease in Madagascar

The first case report of Kawasaki disease in Madagascar was published in 2009. ¹

References

1. Med Trop (Mars) 2008 Dec ;68(6):637-9.

Kikuchi's disease and Kimura disease

Agent	UNKNOWN
Reservoir	Unknown
Vector	None
Vehicle	Unknown
Incubation Period	Unknown
Diagnostic Tests	Biopsy.
Typical Adult Therapy	Supportive Hydroxychloroquine and corticosteroids have been successful for Kikuchi's disease in some cases.
Typical Pediatric Therapy	As for adult
Clinical Hints	Most patients of Asian origin Kikuchi disease: - Prolonged (1 to 12 months) cervical lymphadenopathy (rubbery, non-matted - may be tender) - Fever (40%), weight loss, "sweats", leukopenia Kimura disease: - Similar to Kikuchi disease - Salivary gland involvement, glomerulitis, painless subcutaneous masses and eosinophilia suggest Kimura disease - May be misdiagnosed as filariasis
Synonyms	Angiolymphoid hyperplasia, Angiolymphoid hyperplasia-eosinophilia, Eosinophilic follicular lymphadenitis, Histiocytic necrotizing lymphadenitis, Kikuchi's disease, Kikuchi-Fujimoto disease, Kimura disease. ICD9: 289.3 ICD10: I89.8

Kikuchi's disease and Kimura disease in Madagascar

Three cases of Kikuchi disease were reported by a hospital in Antananarivo (2015 publication). ¹

References

1. [Med Sante Trop 2015 Oct-Dec;25\(4\):441-5.](#)

Kingella infection

Agent	BACTERIUM. <i>Kingella kingae</i> , et al A facultative gram-negative coccobacillus
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Unknown
Diagnostic Tests	Culture of blood, joint fluid, CSF, etc. Alert laboratory if these organisms are suspected.
Typical Adult Therapy	Penicillin G or Penicillin V usually effective - dosage per severity/site
Typical Pediatric Therapy	As for adult
Clinical Hints	Most infections have been in young children. A relatively rare cause of septic arthritis, endocarditis, meningitis and other infections
Synonyms	

Laryngotracheobronchitis

Agent	VIRUS OR BACTERIUM. Parainfluenza virus, Influenza virus, <i>Mycoplasma</i> , et al
Reservoir	Human
Vector	None
Vehicle	Droplet, Respiratory or pharyngeal acquisition
Incubation Period	3d - 8d
Diagnostic Tests	Viral culture (respiratory secretions). Serology. Nucleic acid amplification.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Most cases are in young children Usually encountered in the setting of bronchiolitis, laryngitis or croup following a minor upper respiratory infection
Synonyms	Bronchitis, Croup, Laringitis, Laryngite, Laryngitis, Laryngotracheitis. ICD9: 464,466 ICD10: J04,J05,J20,J21

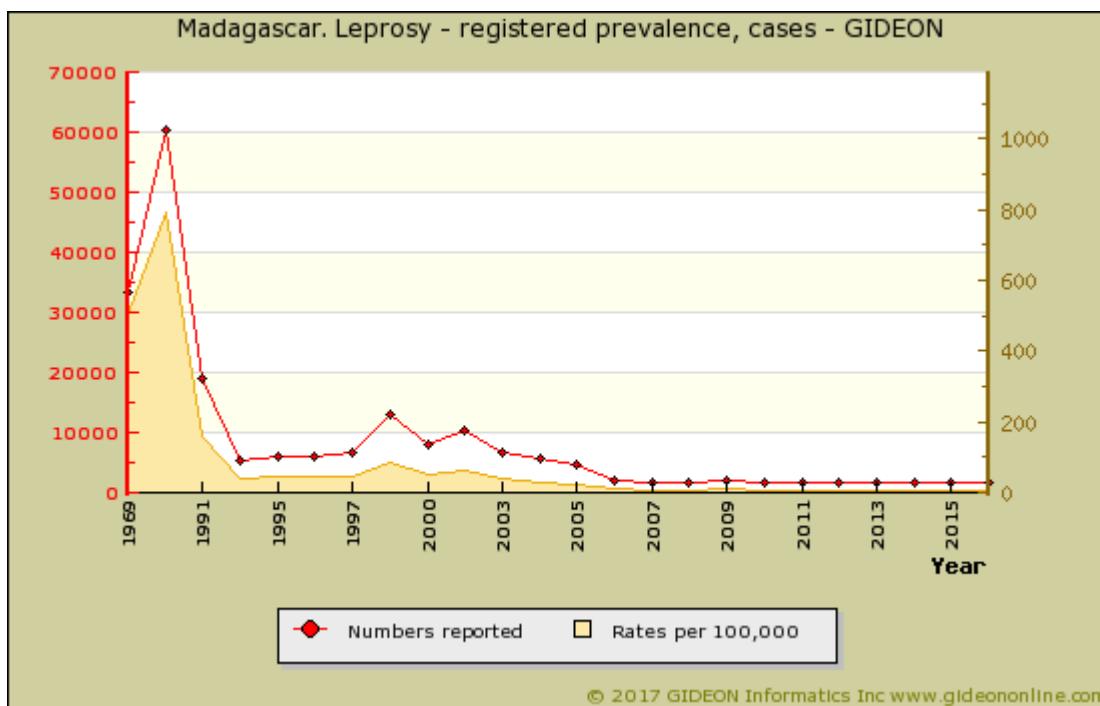
Legionellosis

Agent	BACTERIUM. <i>Legionella pneumophila</i> , et al An aerobic gram-negative bacillus
Reservoir	Water
Vector	None
Vehicle	Water, Aerosols, Droplet, Respiratory or pharyngeal acquisition
Incubation Period	5- 6d (range 2-12d); Pontiac fever = 1-2d
Diagnostic Tests	Serology. Culture. Urine antigen (certain types). Nucleic acid amplification. Alert lab if organism suspected.
Typical Adult Therapy	Fluoroquinolone (Levofloxacin, Trovafloxacin, Pefloxacin, Sparfloxacin or Moxifloxacin). OR Azithromycin. OR Erythromycin + Rifampin OR Clarithromycin
Typical Pediatric Therapy	Azithromycin. OR Erythromycin + Rifampin OR Clarithromycin
Clinical Hints	Respiratory illness with extrapulmonary manifestations (diarrhea, confusion, renal or hepatic dysfunction, relative bradycardia, etc.) Most cases reported during summer in temperate areas Case-fatality rates of 5% to 25% are reported
Synonyms	Doenca dos legionarios, Legionarsjuka, Legionarssjuka, Legionella, Legionellose, Legionellosi, Legionnaire's disease, Pontiac fever. ICD9: 482.84 ICD10: A48.1,A48.2

Leprosy

Agent	BACTERIUM. <i>Mycobacterium leprae</i> <i>Mycobacterium lepromatosis</i> An acid-fast bacillus
Reservoir	Human, Armadillo, Squirrel
Vector	None
Vehicle	Secretions
Incubation Period	3y - 5y (range 3m - 40y)
Diagnostic Tests	Visualization of organisms in exudate, scrapings or biopsy. Nucleic acid amplification.
Typical Adult Therapy	Multibacillary: One year therapy <i>Dapsone</i> 100 mg + <i>Clofazimine</i> 50 mg daily; and, <i>Rifampin</i> 600 mg + <i>Clofazimine</i> 300 mg once monthly Paucibacillary: Six month therapy <i>Dapsone</i> 100 mg daily; and <i>Rifampin</i> 600 mg once monthly
Typical Pediatric Therapy	Multibacillary: One year therapy <i>Dapsone</i> 1 to 2 mg/kg + <i>Clofazimine</i> 1 mg/kg daily; and, <i>Rifampin</i> 10 mg/kg + <i>Clofazimine</i> 1 mg/kg once monthly Paucibacillary: Six month therapy <i>Dapsone</i> 1 to 2 mg/kg daily; and <i>Rifampin</i> 10 mg/kg once monthly
Clinical Hints	Anesthetic, circinate hypopigmented skin lesions and thickened peripheral nerves (tuberculoid leprosy) Diffuse, destructive papulonodular infection (lepromatous leprosy) Combined/intermediate forms are encountered
Synonyms	Aussatz, Doence de Hansen, Hansen's disease, Lebbra, Lepra, <i>Mycobacterium leprae</i> , <i>Mycobacterium lepromatosis</i> . ICD9: 030 ICD10: A30

Leprosy in Madagascar



Graph: Madagascar. Leprosy - registered prevalence, cases

2006; 1,597 in 2007

Notes:

Individual years:

1991 - True number estimated at 50,000 cases.

1993 - True number estimated at 30,000 cases (234.3 per 100,000).

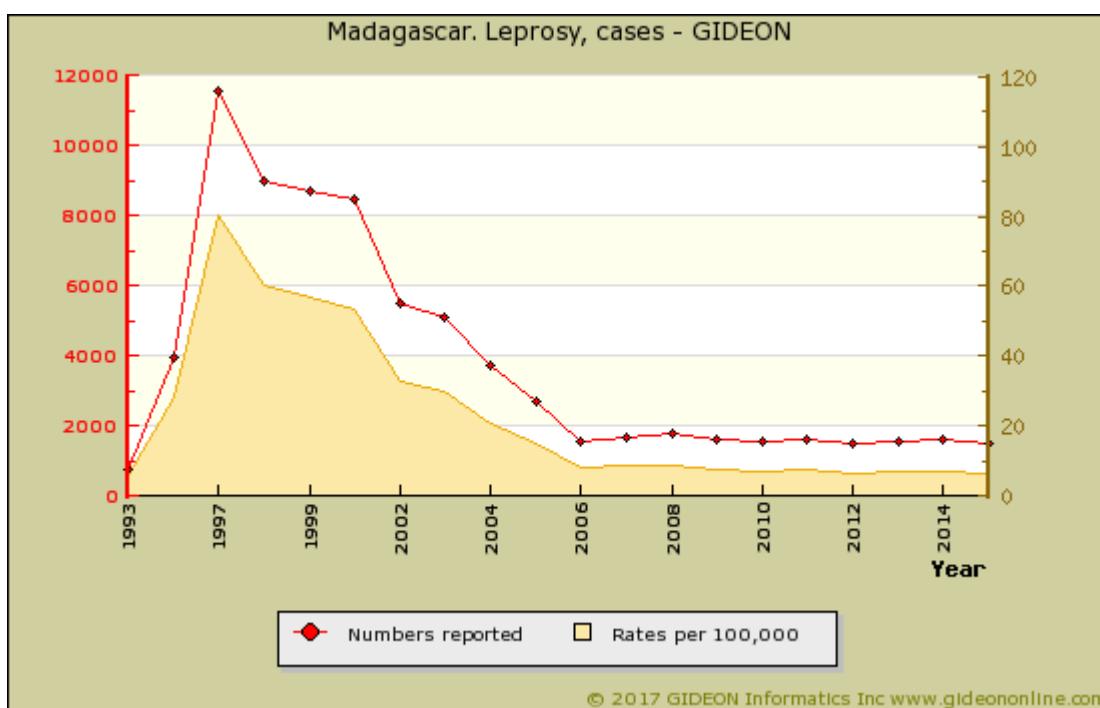
1994 - True number estimated at 12,000 cases.

1995 - True number estimated at 12,000 cases.

1996 - 51.21% multibacillary.

1999 - 4,251 cases (25.83 per 100,000, 57% multibacillary) were detected in 20 districts through active case finding.

2001 - 60% multibacillary.



Graph: Madagascar. Leprosy, cases

Notes:

Individual years:

2000 - Highest rates in Fianarantsoa (187.8 per 100,000).

Prevalence surveys

Years	Region	Study Group	%	Notes
2014*	Madirovalo	patients	1.6	1.6% of neurological disorders presenting to a primary health clinic (Madirovalo, 2014 publication) ¹

* indicates publication year (not necessarily year of survey)

MDT coverage is 100% (1998).

References

-
1. Med Sante Trop 2014 Jul-Sep;24(3):312-6.

Leptospirosis

Agent	BACTERIUM. <i>Leptospira interrogans</i> , et al. An aerobic non-gram staining spirochete
Reservoir	Cattle, Dog, Horse, Deer, Rodent, Fox, Marine mammal, Cat, Marsupial, Frog
Vector	None
Vehicle	Water, Soil, Urine contact, Breastfeeding
Incubation Period	7d - 12d (range 2d - 26d)
Diagnostic Tests	Culture on specialized media. Dark field microscopy of urine, CSF. Serology.
Typical Adult Therapy	Penicillin 1.5 million units Q6h iv OR Doxycycline 100 mg BID X 5 to 7d OR Ceftriaxone 1g IV daily
Typical Pediatric Therapy	Penicillin G 50,000u/kg q6h iv X 5 to 7d Age >= 8y: Doxycycline 2.2 mg/kg BID X 5 to 7d may also be used
Clinical Hints	"Sterile" meningitis, nephritis, hepatitis, myositis and conjunctivitis Often follows recent skin contact with fresh water in rural or rodent-infested areas Case-fatality rates of 5% to 40% are reported
Synonyms	Andaman hemorrhagic fever, Canefield fever, Canicola fever, Field fever, Fish handler's disease, Fort Bragg fever, Japanese autumnal fever, Leptospira, Leptospirose, Leptospirosen, Leptospirosi, Mud fever, Pre-tibial fever, Rat fever, Rice field fever, Swamp fever, Swineherd disease, Weil's disease. ICD9: 100 ICD10: A27

Leptospirosis in Madagascar

1955 - The first case of human leptospirosis in Madagascar was confirmed. ¹

2012 - A second case of human infection was confirmed. ²

As of 2001, leptospirosis had not been documented in cattle, rats, cattle or pigs in Madagascar. ^{3 4}

Prevalence surveys

Years	Region	Study Group	%	Notes
2012*		bats	34.6	34.6% of bats (2012 publication) ⁵
2008	multiple locations	small mammals	8.5-54	54% of small mammals in Moramanga, 48% in Toliara, 47.4% in Mahajanga, 8.5% in Antsiranana and 14% in Toamasina (2008) ⁶
2014*		small mammals	13	13% of small mammals (2014 publication) ⁷

* indicates publication year (not necessarily year of survey)

Seroprevalence surveys

Years	Region	Study Group	%	Notes
2011	Moramanga	general population	2.9	2.9% of individuals in Moramanga (2011) ⁸

References

1. J Travel Med 2015 Mar-Apr;22(2):136-9.
2. J Travel Med 2015 Mar-Apr;22(2):136-9.
3. Arch Inst Pasteur Madagascar 2001 ;67(1-2):34-6.
4. Bull Soc Pathol Exot Filiales 1968 ;61(3):346-59.
5. Emerg Infect Dis 2012 Oct ;18(10):1696-8.
6. PLoS One 2010 ;5(11):e14111.

7. Mol Ecol 2014 Jun ;23(11):2783-96.
8. PLoS One 2015 ;10(4):e0122683.

Listeriosis

Agent	BACTERIUM. <i>Listeria monocytogenes</i> A facultative gram-positive bacillus
Reservoir	Mammal, Human, Bird, Soil, Water
Vector	None
Vehicle	Transplacental, Dairy products (eg, soft cheeses), Infected secretions, Vegetables, Poultry, Water
Incubation Period	3d - 21d (60d post-ingestion)
Diagnostic Tests	Culture of blood or CSF.
Typical Adult Therapy	Ampicillin 2g IV q6h X 2w (higher dosage in meningitis) + Gentamicin . Sulfamethoxazole / Trimethoprim recommended for Penicillin-allergic patients
Typical Pediatric Therapy	Ampicillin 50 mg/kg IV Q6h X 2w (higher dosage in meningitis). Sulfamethoxazole / Trimethoprim recommended for Penicillin-allergic patients
Clinical Hints	Meningitis or sepsis, often in immune-suppressed patients (lymphoma, AIDS, etc) Gastroenteritis - may follow ingestion of "over-the-counter" foods Neonatal septicemia occasionally encountered
Synonyms	Listeria monocytogenes, Listeriose, Listeriosi. ICD9: 027.0 ICD10: A32

Listeriosis in Madagascar

Listeriosis, cases: None reported between 1997 and 1998

Liver abscess - bacterial

Agent	BACTERIUM. Various species from portal (Bacteroides, mixed aerobe-anaerobe) or biliary (<i>Escherichia coli</i> , etc) source
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Ultrasound, CT or radionuclide scan. If amoebic abscess suspected, perform Entamoeba serology
Typical Adult Therapy	Intravenous antibiotic(s) directed at likely or suspected pathogens. Percutaneous or open drainage
Typical Pediatric Therapy	As for adult
Clinical Hints	Tender liver and prolonged fever in a patient with history of diverticulitis, cholecystitis, appendicitis, etc Clinically similar to amoebic abscess, but often multiple.
Synonyms	Ascesso fegato, Bacterial liver abscess, Hepatic abscess - bacterial, Liver abscess. ICD9: 572.0 ICD10: K75.0

Lymphocytic choriomeningitis

Agent	VIRUS - RNA. Arenaviridae, Arenavirus: Lymphocytic choriomeningitis virus
Reservoir	House mouse, Guinea pig, Hamster, Monkey
Vector	None
Vehicle	Urine, Saliva, Feces, Food, Dust, Respiratory or pharyngeal acquisition
Incubation Period	8d - 12d (range 6d - 14d)
Diagnostic Tests	Viral culture (blood, throat, CSF). Serology. Nucleic acid amplification. Biosafety level 3.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Headache, myalgia, meningitis and encephalitis Photophobia or pharyngitis may be present Preceding exposure to rodents Infection resolves within 2 weeks, however convalescence may require an additional 2 months.
Synonyms	

Lymphogranuloma venereum

Agent	BACTERIUM. Chlamydiaceae, Chlamydiae , <i>Chlamydia trachomatis</i> , types L1, L2, L3
Reservoir	Human
Vector	None
Vehicle	Sexual contact
Incubation Period	7d - 12d (range 3d - 30d)
Diagnostic Tests	Serology. Culture of pus performed in specialized laboratories.
Typical Adult Therapy	Doxycycline 100 mg PO BID X 3w. OR Erythromycin 500 mg QID X 3w OR Azithromycin 1g po weekly X 3w
Typical Pediatric Therapy	Age < 8 years: Erythromycin 10 mg/kg PO QID X 2 to 4w. Age >= 8 years: Doxycycline 2 mg/kg PO BID X 2 to 4w
Clinical Hints	Genital nodule or vesicle with large, suppurating regional nodes Generalized lymphadenopathy or proctitis may be present Late complications include genital edema, rectal strictures and perianal abscesses
Synonyms	Bubonulus, Durand-Nicolas-Favre disease, Linfogranuloma venereo, Lymphogranuloma inguinale, Lymphopathia venereum, Maladie de Nicolas et Favre, Tropical bubo, Venereal bubo, Venerisk lymfogranulom. ICD9: 099.1 ICD10: A55

Lymphogranuloma venereum in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
1992 - 1993	Antananarivo	patients - STD	24	24% of genital ulcers treated in venereal disease clinics (Antananarivo, 1992 to 1993) ¹

References

1. [Sex Transm Dis 1994 Nov-Dec;21\(6\):315-20.](#)

Malaria

Agent	PARASITE - Protozoa. Apicomplexa, Haemosporida: <i>Plasmodium</i> spp.
Reservoir	Human Primate (<i>Plasmodium knowlesi</i>)
Vector	Mosquito (Anopheles)
Vehicle	Blood
Incubation Period	7d -30d
Diagnostic Tests	Examination of blood smear. Serology, antigen & microscopic techniques. Nucleic acid amplification.
Typical Adult Therapy	Resistant falcip: Lumefantrine / Artemether OR Quinine + Doxycycline or Clindamycin OR Atovaquone / Proguanil OR Artesunate IV (severe malaria) If sens., Chloroquine 1g, then 500 mg 6, 24 & 48 hrs. If P. ovale or P. vivax - follow with Primaquine
Typical Pediatric Therapy	Resistant falcip: Lumefantrine / Artemether OR Quinine + Clindamycin OR Atovaquone / Proguanil OR Artesunate (>age 8) IV (severe malaria) If sens, Chloroquine 10 mg/kg, then 5 mg/kg 6, 24, & 48 hrs. If P. ovale or P. vivax - follow with Primaquine
Clinical Hints	Fever, headache, rigors ("shaking chills"), vomiting, myalgia, diaphoresis and hemolytic anemia Fever pattern (every other or every third day) and splenomegaly may be present Clinical disease may relapse after 7 (<i>ovale</i> and <i>vivax</i>) to 40 (<i>malariae</i>) years
Synonyms	Ague, Bilious remittent fever, Chagres fever, Estiautumnal fever, Marsh fever, Marsh fever, Paludism, Paludismo, <i>Plasmodium brasiliandum</i> , <i>Plasmodium falciparum</i> , <i>Plasmodium knowlesi</i> , <i>Plasmodium malariae</i> , <i>Plasmodium ovale</i> , <i>Plasmodium vivax</i> . ICD9: 084 ICD10: B50,B51,B52,B53,B54

Chloroquine resistant falciparum malaria endemic to 80 countries. Chloroquine-sensitive malaria endemic to 28 countries.

Malaria in Madagascar

Time and Place:

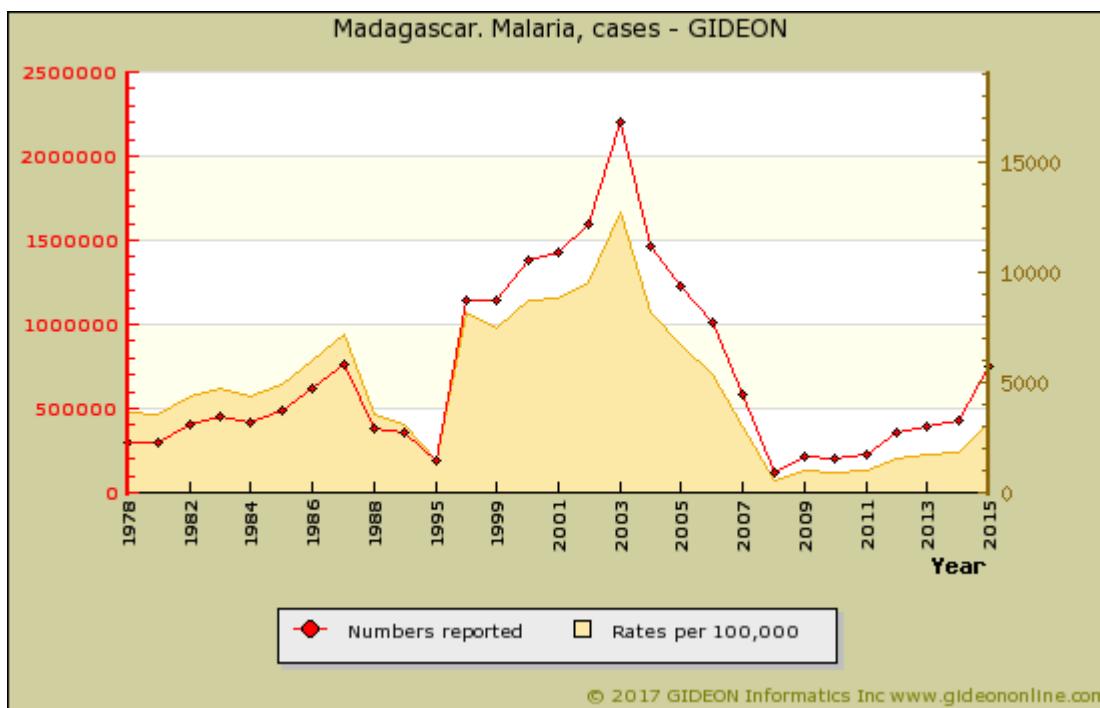
Malaria is reported throughout the country during all seasons.

- Transmission has been documented in the suburbs of Antananarivo (Ikopa River area). ¹
- Autochthonous malaria is rare in Antananarivo. ²
- Status reports on malaria in Madagascar - 2012 to 2013 ³ 2016 ⁴

Infecting species:

Chloroquine-resistant *P. falciparum* **IS** reported. ^{5 6 7 8}

- *Plasmodium falciparum* accounts for over 85% of cases in Madagascar.
- *In-vitro* resistance to mefloquine is found in 3.9% of *P. falciparum* (range 0% on the west coast and south, to 10.0% on the east coast).
- Chloroquine-resistant *Plasmodium vivax* has been identified in Madagascar since 2006. ^{9 10}



Graph: Madagascar. Malaria, cases

Notes:

1. Incidence for 2000 to 2005 includes data from reference [11](#)

Highland malaria: [12](#)

The Highlands had been malaria free until 1878, when a severe epidemic occurred, following the development of irrigated rice farming. Between 1949 and 1962, highland malaria was "eradicated" through a program of house spraying and mass chemoprophylaxis measures.

- The main vector *An. funestus* disappeared from the highlands; however, during 1986 to 1988, a major epidemic with high mortality rates was reported from the area. [13](#) [14](#)
- 51% of children below age 10 living in the Ranomafana rainforest are infected.
- A malaria control program in the highlands reduced prevalence among children ages 5 to 14 from 25.6% (1989 to 1993) to 0.3% (1998 to 2000).

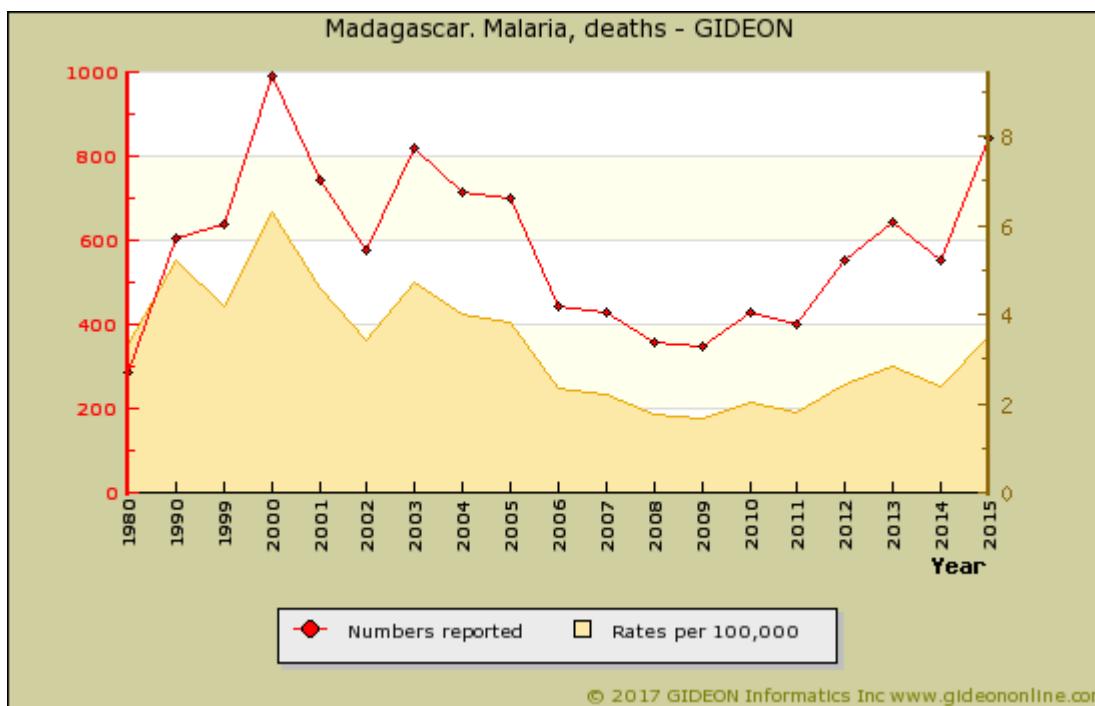
Prevalence surveys

Years	Region	Study Group	%	Notes
2002 - 2005		children	19.9	19.9% of school children in the western foothill region (2002 to 2005) 15
2009 - 2010	Highlands	children	10.5	10.5% of children ages =5 years in the central Highlands (2009 to 2010) 16
2012*		children	89.5	89.5% of febrile children (PCR, 2012 publication) 17
2012 - 2013		general population	3.1	3.1% of the general population (2012 to 2013) 18
2016*	Makira	general population	27.8	19
2010	Highlands	pregnant women	9.2	9.2% / 14.8% of pregnant women in the highlands / coast (2010) 20

* indicates publication year (not necessarily year of survey)

Seroprevalence surveys

Years	Study Group	%	Notes
2010	pregnant women	67.4-95.6	67.4% / 95.6% of pregnant women in the highlands / coast (2010) 21



Graph: Madagascar. Malaria, deaths

Notes:

- Figures for 1980, 1990, 2000 and 2010 are based on estimates of true mortality.²² Since these estimates are significantly higher than official Health Ministry reports for other years during this period, resultant graphs will suggest unusual fluctuation in trends.
- 40,000 fatal cases were estimated for the period 1985 to 1990.

Vectors:

26 *Anopheles* species have been identified in Madagascar.

- The principal vector in Madagascar is *Anopheles funestus*.²³
- An. arabiensis*, *An. gambiae*^{24 25} and *An. mascarensis* are also implicated.^{26 27}
- Additional vectors include *An. merus*²⁸, *An. coustani*²⁹, *An. flavicosta*, *An. pharoensis*.

Notable outbreaks

Years	Region	Cases	Deaths	Notes
1878	Tananaive			30
1895				Outbreak reported - additional details unavailable. ³¹
1983 - 1986	Antananarivo			32 33
1986 - 1988	Highlands Region			34 35 36 37 38 39
2011 - 2012	Southeast Region			40
2012	Southern Region		7	41
2013	Highlands Region			42
2015		212,923	187	212,923 cases, 187 fatal were reported during January to May ⁴³

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- Malar J* 2014 ;13:465.
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- J Infect Dis* 2002 Mar 1;185(5):710-2.
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13. Ann Trop Med Parasitol 1991 Jun ;85(3):297-304.
14. Parassitologia 1999 Sep ;41(1-3):373-6.
15. Malar J 2014 Jan 14;13:21.
16. Med Sante Trop 2012 Jul-Sep;22(3):317-22.
17. Malar J 2012 Mar 25;11:85.
18. Malar J 2014 ;13:465.
19. Malar J 2016 Dec 20;15(1):596.
20. Malar J 2015 May 03;14:188.
21. Malar J 2015 May 03;14:188.
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25. J Vector Ecol 2012 Dec ;37(2):402-6.
26. Arch Inst Pasteur Madagascar 2003 ;69(1-2):57-62.
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28. Acta Trop 2004 Jan ;89(2):193-203.
29. Malar J 2015 ;14:475.
30. Sante 1996 Mar-Apr;6(2):79-86.
31. Sante 1996 Mar-Apr;6(2):79-86.
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33. Sante 1995 Nov-Dec;5(6):382-5.
34. Bull Soc Pathol Exot 1990 ;83(3):330-41.
35. Bull Soc Pathol Exot 1997 ;90(3):162-8.
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37. Arch Inst Pasteur Madagascar 2001 ;67(1-2):21-6.
38. Arch Inst Pasteur Madagascar 1989 ;56(1):97-130.
39. Bull Soc Pathol Exot 1998 ;91(1):64-6.
40. Malar J 2016 Feb 02;15:57.
41. ProMED <promedmail.org> archive: 20120512.1131169
42. Malar J 2015 ;14:475.
43. ProMED <promedmail.org> archive: 20150622.3455576

Malignant otitis externa

Agent	BACTERIUM. <i>Pseudomonas aeruginosa</i> : aerobic gram-negative bacillus (virtually all cases)
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Culture of otic exudate and biopsy material. Careful roentgenographic and neurological examinations.
Typical Adult Therapy	Early debridement <i>Ciprofloxacin</i> 400 mg iv Q8h Alternatives: <i>Imipenem</i> , <i>Meropenem</i> , <i>Ceftazidime</i> , <i>Cefepime</i> Early debridement
Typical Pediatric Therapy	Early debridement <i>Imipenem</i> : Age 0 to 7 days: 25 mg/kg IV Q12h Age 8 to 28 days: 25 mg/kg IV Q8h Age >28 days: 15 to 25 mg/kg IV Q6h (maximum 2 g/day) Alternatives: <i>Meropenem</i> , <i>Ceftazidime</i> , <i>Cefepime</i>
Clinical Hints	Otic pain, swelling and discharge Infection of bony and cartilaginous ear canal Over 80% of patients are diabetics over age 50 Cranial nerve (usually VII) signs in 50% Case-fatality rate > 55%.
Synonyms	

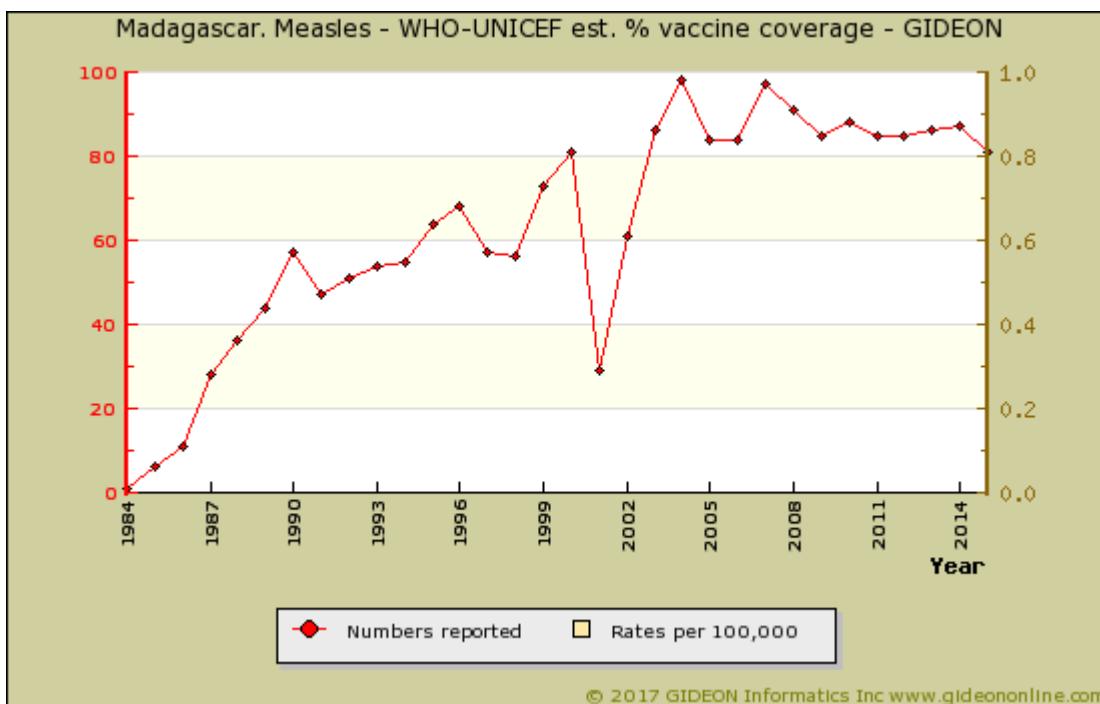
Measles

Agent	VIRUS - RNA. Mononegavirales Paramyxoviridae, Paramyxovirinae, Morbillivirus: Measles virus
Reservoir	Human
Vector	None
Vehicle	Droplet, Respiratory or pharyngeal acquisition
Incubation Period	8d - 14d
Diagnostic Tests	Viral culture (difficult and rarely indicated). Serology. Nucleic acid amplification.
Typical Adult Therapy	Respiratory isolation; supportive. Ribavirin 20 to 35 mg/kg/day X 7 days has been used for severe adult infection
Typical Pediatric Therapy	As for adult
Vaccines	Measles vaccine Measles-Mumps-Rubella vaccine Measles-Rubella vaccine
Clinical Hints	Coryza, fever, headache, conjunctivitis, photophobia and a maculopapular rash after 3 to 5 days Koplik's spots (bluish-grey lesions on buccal mucosa, opposite second molars) often precede rash Encephalitis or viral pneumonia occasionally encountered
Synonyms	Masern, Massling, Mazelen, Meslinger, Morbilli, Morbillo, Rubeola, Rugeole, Sarampion, Sarampo. ICD9: 055 ICD10: B05

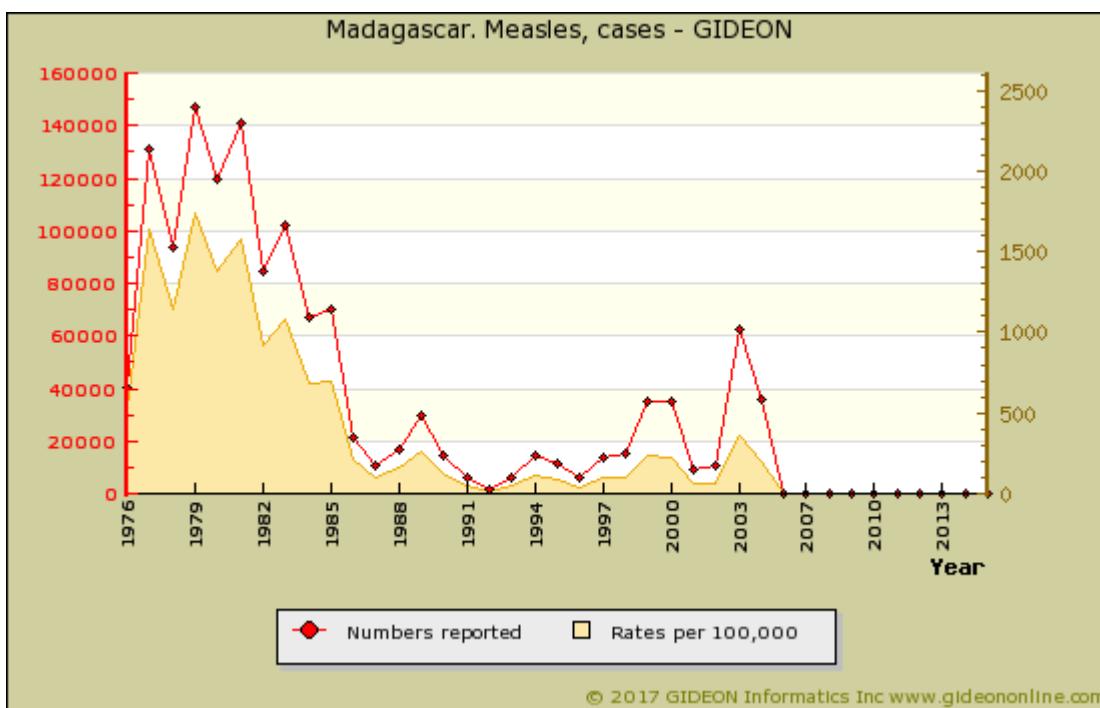
Measles in Madagascar

Vaccine Schedule:

BCG - birth
DTwPHibHepB - 6,10,14 weeks
IPV - 14 weeks
Measles - 9 months
OPV - birth; 6,10,14 weeks
Pneumo conj - 6,10,14 weeks
Rotavirus - 6,10 weeks
TT - 1st contact pregnancy; +1, +6 months; +1, +1 year



Graph: Madagascar. Measles - WHO-UNICEF est. % vaccine coverage



Graph: Madagascar. Measles, cases

Melioidosis

Agent	BACTERIUM. <i>Burkholderia pseudomallei</i> An aerobic gram-negative bacillus
Reservoir	Soil, Water, Sheep, Goat, Horse, Pig, Rodent, Monkey, Marsupial
Vector	None
Vehicle	Water (contact, ingestion, aerosol), Breastfeeding, Sexual contact, Respiratory or pharyngeal acquisition
Incubation Period	3d - 21d (range 2d - 1y)
Diagnostic Tests	Culture of blood, sputum, tissue. Serology. Nucleic acid amplification.
Typical Adult Therapy	Ceftazidime or Meropenem or Imipenem IV X at least 14 days May be combined with Sulfamethoxazole / Trimethoprim PO Follow with Sulfamethoxazole / Trimethoprim +/- Doxycycline X at least 3 months.
Typical Pediatric Therapy	Ceftazidime or Meropenem or Imipenem IV X at least 14 days May be combined with Sulfamethoxazole / Trimethoprim PO Follow with Sulfamethoxazole / Trimethoprim X at least 3 months.
Clinical Hints	May present as: - lymphangitis with septicemia - fever, cough and chest pain - diarrhea Bone, central nervous system, liver and parotid infection are occasionally encountered Case-fatality rate 10% to over 50% (septicemic form)
Synonyms	Burkholderia pseudomallei, Burkholderia thailandensis, Melioidose, Nightcliff Gardeners' Disease, Whitmore disease. ICD9: 025 ICD10: A24.1,A24.2,A24.3,A24.4

Melioidosis in Madagascar

Time and Place:

The first report of melioidosis in Africa was that of an infected pig in Madagascar, in 1936. ¹

- One autochthonous case of human melioidosis was reported in 2012; 1 in 2013 ^{2 3}

2004 (publication year) - A case in Reunion had been imported from Madagascar. ⁴

2006 (publication year) - A case in Reunion had been imported from Madagascar. ⁵

2013 - A Belgian tourist acquired melioidosis in Madagascar. ⁶

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5. Emerg Infect Dis 2013 Jun ;19(6):981-4.
6. ProMED <promedmail.org> archive: 20130503.1687746

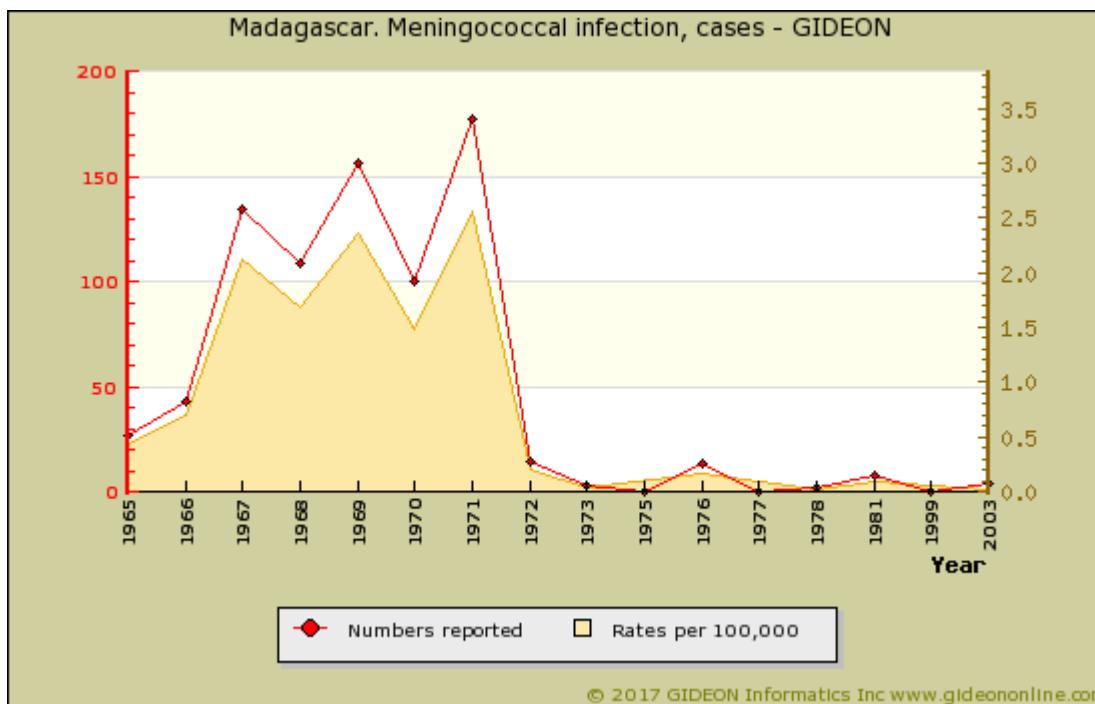
Meningitis - aseptic (viral)

Agent	VIRUS - RNA. Picornaviridae, enteroviruses
Reservoir	Human
Vector	None
Vehicle	Fecal-oral, Droplet
Incubation Period	Variable
Diagnostic Tests	Viral isolation (stool, CSF, throat). Serology.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Lymphocytic meningitis, with normal CSF glucose level Often follows sore throat Typically occurs during late summer and early autumn in temperate regions
Synonyms	Aseptic meningitis, Encephalitis - viral, Meningite virale, Meningitis, viral, Meningo-encefalite virale, Viral encephalitis, Viral meningitis. ICD9: 047,048,049,320.2 ICD10: A87,G03.0

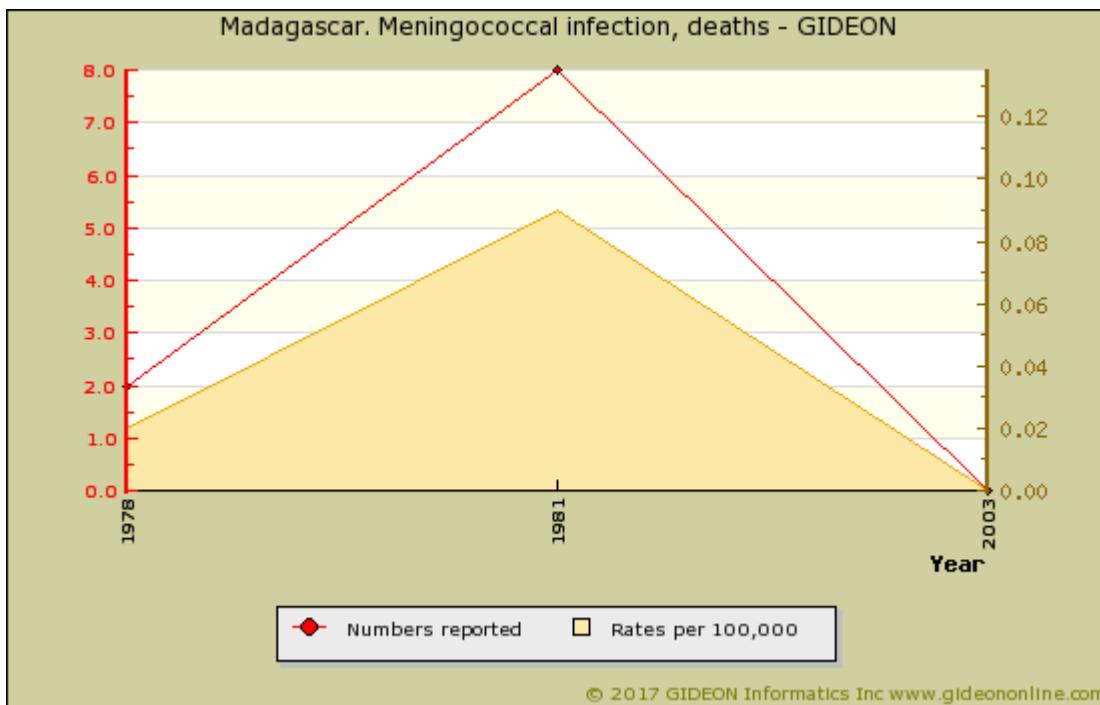
Meningitis - bacterial

Agent	BACTERIUM. <i>Neisseria meningitidis</i> , <i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> , et al
Reservoir	Human
Vector	None
Vehicle	Air, Secretions
Incubation Period	Variable
Diagnostic Tests	CSF microscopy and culture. Blood culture. Note: Antigen detection is non-specific and rarely useful.
Typical Adult Therapy	Bactericidal agent(s) appropriate to known or suspected pathogen + dexamethasone
Typical Pediatric Therapy	As for adult
Vaccines	H. influenzae (HbOC-DTP or -DTaP) vaccine Haemophilus influenzae (HbOC) vaccine Haemophilus influenzae (PRP-D) vaccine Haemophilus influenzae (PRP-OMP) vaccine Haemophilus influenzae (PRP-T) vaccine Meningococcal vaccine Hepatitis B + Haemoph. influenzae vaccine
Clinical Hints	Headache, stiff neck, obtundation, high fever and leukocytosis Macular or petechial rash and preceding sore throat suggest meningococcal infection
Synonyms	Bacterial meningitis, Enfermedad Meningococica, Haemophilus influenzae, Haemophilus influenzaes, HIB meningitis, HIBs, Infections a meningocoque, Meningite batterica, Meningite meningococcica, Meningococcal, Meningokokken Erkr., Meningokokkose. ICD9: 036.0,320 ICD10: A39,G00,G01,G02

Meningitis - bacterial in Madagascar



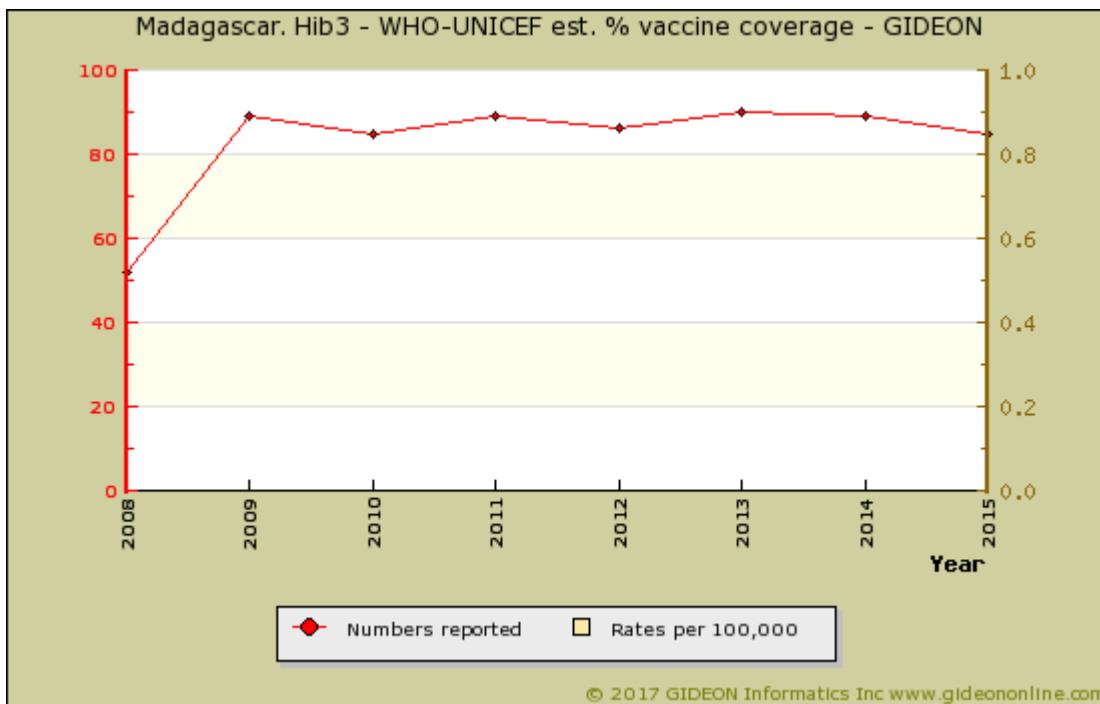
Graph: Madagascar. Meningococcal infection, cases



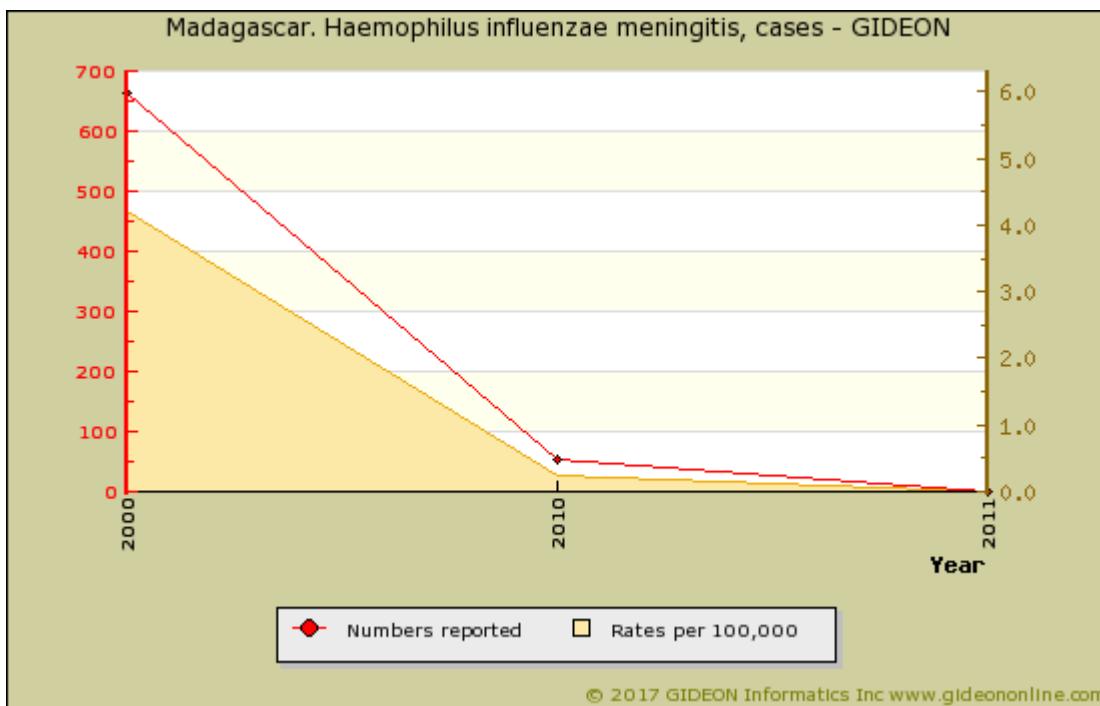
Graph: Madagascar. Meningococcal infection, deaths

Vaccine Schedule:

BCG - birth
DTwPHibHepB - 6,10,14 weeks
IPV - 14 weeks
Measles - 9 months
OPV - birth; 6,10,14 weeks
Pneumo conj - 6,10,14 weeks
Rotavirus - 6,10 weeks
TT - 1st contact pregnancy; +1, +6 months; +1, +1 year



Graph: Madagascar. Hib3 - WHO-UNICEF est. % vaccine coverage

Graph: Madagascar. *Haemophilus influenzae* meningitis, cases

Notes:

- As of 2000, *Haemophilus influenzae* was the second most common agent of bacterial meningitis in children (after *Streptococcus pneumoniae*). ¹

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Microsporidiosis

Agent	FUNGUS. Microsporidia: Enterocytozoon, <i>Encephalitozoon (Septata)</i> , <i>Vittaforma (Nosema)</i> , <i>Pleistophora</i> , <i>Trachipleistophora</i> , et al.
Reservoir	Rabbit, Rodent, Carnivore, Non-human primate, Fish, Dog, Bird
Vector	None
Vehicle	Fecal-oral
Incubation Period	Unknown
Diagnostic Tests	Microscopy of duodenal aspirates. Inform laboratory if this organism is suspected. Nucleic acid amplification.
Typical Adult Therapy	Albendazole 400 mg PO BID X 3 weeks. Add Fumagillin for ocular <i>S. intestinalis</i> may respond to Albendazole and Fumagillin Nitazoxanide has been used for <i>E. bieneusi</i> .
Typical Pediatric Therapy	Albendazole 200 mg PO BID X 3 weeks. Add Fumagillin for ocular <i>S. intestinalis</i> may respond to Albendazole and Fumagillin Nitazoxanide has been used for <i>E. bieneusi</i> .
Clinical Hints	Self-limited diarrhea, traveler's diarrhea or asymptomatic carriage Immunocompromised patients present with chronic diarrhea, cholangitis, cholecystitis, sinusitis or pneumonia Ocular microsporidiosis is associated with keratoconjunctivitis Hepatitis or myositis are reported in some cases
Synonyms	Anncaliia, Brachiola, Encephalitozoon, Enterocytozoon, Microsporidium, Nosema, Pleistophora, Trachipleistophora, Tubulinosema, Vittaforma. ICD9: 136.8 ICD10: A07.8

Molluscum contagiosum

Agent	VIRUS - DNA. Poxviridae. Molluscipoxvirus. Molluscum contagiosum virus
Reservoir	Human
Vector	None
Vehicle	Contact, Sexual contact, Vertical transmission
Incubation Period	2-7 w (range 14 to 180d)
Diagnostic Tests	Histology of excised material. Nucleic acid amplification
Typical Adult Therapy	Topical therapy; excision
Typical Pediatric Therapy	As for adult
Clinical Hints	One or more raised, flesh-colored skin lesions with depressed center Lesions persist for 6 to 12 weeks Disseminated and indolent forms encountered, particularly in immune-suppressed patients
Synonyms	Water warts. ICD9: 078.0 ICD10: B08.1

Mumps

Agent	VIRUS - RNA. Mononegavirales Paramyxoviridae, Paramyxovirinae, Rubulavirus: Mumps virus
Reservoir	Human
Vector	None
Vehicle	Aerosol, Respiratory or pharyngeal acquisition
Incubation Period	14d - 24d (range 12d - 24d)
Diagnostic Tests	Viral culture (saliva, urine, CSF) indicated only in complicated cases. Serology. Nucleic acid amplification.
Typical Adult Therapy	Respiratory isolation; supportive
Typical Pediatric Therapy	As for adult
Vaccines	Measles-Mumps-Rubella vaccine Mumps vaccine Rubella - Mumps vaccine
Clinical Hints	Fever and parotitis Orchitis (20% of post-pubertal males), meningitis (clinically apparent in 1% to 10%), oophoritis, or encephalitis (0.1%) Most cases resolve within 1 to 2 weeks
Synonyms	Bof, Epidemic parotitis, Fiebre urliana, Infectious parotitis, Kusma, Oreillons, Paperas, Parotidite epidemica, Parotiditis, Parotite epidemica, Passjuka. ICD9: 072 ICD10: B26

Myalgic encephalomyelitis

Agent	UNKNOWN
Reservoir	Unknown
Vector	None
Vehicle	Unknown
Incubation Period	Unknown
Diagnostic Tests	Clinical diagnosis; ie, discount other diseases.
Typical Adult Therapy	Supportive; ? immune modulators (experimental)
Typical Pediatric Therapy	As for adult
Clinical Hints	Unexplained depression, fatigue, cognitive disorders and sleep disturbance Recurrent bouts of pharyngitis and adenopathy Rheumatological symptoms and fever persist more than six months
Synonyms	Chronic fatigue syndrome, Systemic exercise intolerance disease. ICD9: 780.71 ICD10: G93.3

Mycetoma

Agent	BACTERIUM OR FUNGUS. <i>Nocardia</i> spp, <i>Madurella mycetomatis</i> , <i>Actinomadura pellitieri</i> , <i>Streptomyces somaliensis</i> , et al
Reservoir	Soil, Vegetation
Vector	None
Vehicle	Contact, Wound, Soil
Incubation Period	2w - 2y
Diagnostic Tests	Bacterial and fungal culture of material from lesion.
Typical Adult Therapy	Antimicrobial or antifungal agent as determined by culture. Excision as indicated
Typical Pediatric Therapy	As for adult
Clinical Hints	Painless, chronic, draining, fistulous subcutaneous nodule - usually involving lower extremity Osteolytic lesions may be noted on x-ray Usually no fever Most patients are males age 20 to 40 (ie, occupational exposure).
Synonyms	Coelomycetes, Curvularia lunata, Cyphellophora, Diaporthe, Emarella, Fusarium subglutinans, Gloniopsis, Lasiodiplodia, Leptosphaeria tompkinsii, Madura foot, Madura-Fuss, Madurella, Medicopsis, Mycetom, Paraconiothyrium, Peyronellaea, Pleurostomophora, White grain eumycetoma. ICD9: 039.4,117.4 ICD10: B47

Mycobacteriosis - M. marinum

Agent	BACTERIUM. Actinomycetes, <i>Mycobacterium marinum</i> An aerobic acid-fast bacillus
Reservoir	Fresh and salt water (swimming pools, aquaria), Fish (ornamental, salmon, sturgeon, bass)
Vector	None
Vehicle	Water (per areas of minor skin trauma), Contact
Incubation Period	5d - 270d (median 21d)
Diagnostic Tests	Mycobacterial culture from lesion. Alert laboratory when this organism is suspected.
Typical Adult Therapy	Clarithromycin 500 mg BID X 3m Or Rifampicin 600 mg/day + Ethambutol 20 mg/kg/day X 6w. OR Minocycline 100 mg /day X 3m
Typical Pediatric Therapy	Sulfamethoxazole/trimethoprim 5 mg-25 mg/kg BID X 6w. Alternative Minocycline (Age >= 8)
Clinical Hints	Violaceous papule, ulcer, plaque, psoriaform lesion Onset weeks after exposure to swimming pool, aquarium, other water source Commonly involves the elbow, knee, hand or foot
Synonyms	Aquarium granuloma, Fish fanciers' finger syndrome, Fish tank granuloma, Mariner's TB, <i>Mycobacterium balnei</i> , <i>Mycobacterium marinum</i> , <i>Mycobacterium scrofulaceum</i> , Spam, Swimming pool granuloma. ICD9: 031.1 ICD10: A31.1

Mycobacteriosis - M. scrofulaceum

Agent	BACTERIUM. Actinomycetes, <i>Mycobacterium scrofulaceum</i> An aerobic acid-fast bacillus
Reservoir	Water (lakes, rivers), Soil, Raw milk, Plant material
Vector	None
Vehicle	Water, Soil, Areas of minor trauma, Contact
Incubation Period	Unknown
Diagnostic Tests	Culture of tissue or aspirates.
Typical Adult Therapy	Excision. Drugs (Isoniazid - Rifampin - streptomycin - Cycloserine) are rarely indicated
Typical Pediatric Therapy	As for adult
Clinical Hints	Painless lymphadenopathy, most commonly unilateral and submandibular In contrast, true tuberculosis involves the lower neck and produces a strongly positive tuberculin reaction and/or suggestive chest X ray The condition is most common during early childhood.
Synonyms	

Mycobacteriosis - miscellaneous nontuberculous

Agent	BACTERIUM. Actinomycetes, <i>Mycobacterium</i> spp. - over 130 species as of 2016 An aerobic acid-fast bacillus
Reservoir	Water, Soil, Fish, Mammal, Bird
Vector	None
Vehicle	Air, Water, Milk (<i>M. bovis</i>), Contact, Ingestion, Trauma, Respiratory or pharyngeal acquisition
Incubation Period	Variable
Diagnostic Tests	Microscopy & culture of tissue, secretions, blood. Nucleic acid amplification. Inform laboratory if suspected
Typical Adult Therapy	Drug, route and duration appropriate to clinical setting and species (in Therapy module, scroll through upper left box)
Typical Pediatric Therapy	As for adult
Clinical Hints	Pneumonia, or chronic granulomatous infection of various tissues Systemic disease may complicate immune suppression <i>Mycobacterium avium-intracellulare</i> infection characterized by aggressive course and resistance to most antimycobacterial drugs
Synonyms	<i>Mycobacterium abscessus</i> , <i>Mycobacterium avium</i> , <i>Mycobacterium avium-intracellulare</i> , <i>Mycobacterium chimaera</i> , <i>Mycobacterium franklinii</i> , <i>Mycobacterium immunogenum</i> , <i>Mycobacterium jacussii</i> , <i>Mycobacterium kyorinense</i> , <i>Mycobacterium xenopi</i> , <i>Segniliparus</i> . ICD9: 031.9,031.2 ICD10: A31.0,A31.1,A31.8

Mycoplasma (miscellaneous) infection

Agent	BACTERIUM. Mycoplasmatales <i>Mycoplasma genitalium</i> , <i>Mycoplasma hominis</i> , <i>Mycoplasma fermentans</i> , <i>Mycoplasma penetrans</i> , <i>Mycoplasma parvum</i> , <i>Ureaplasma urealyticum</i>
Reservoir	Human
Vector	None
Vehicle	Secretion, Sexual contact, Respiratory or pharyngeal acquisition
Incubation Period	Unknown
Diagnostic Tests	Culture (urine, pharynx). Serology. Nucleic acid amplification.
Typical Adult Therapy	Doxycycline 100 mg PO BID X 7 days OR Azithromycin 500 g PO, then 250 mg PO X 4 days OR Levofloxacin 500 mg daily X 7 days OR Ofloxacin 300 mg BID X 7 days
Typical Pediatric Therapy	Erythromycin 10 mg/kg PO QID X 2w
Clinical Hints	Urethritis, vaginitis, neonatal pneumonia Rarely stillbirth, prematurity or infertility
Synonyms	Acholeplasma laidlawii, Epirythrozoon, Hemotrophic Mycoplasma, Mycoplasma amphoriforme, Mycoplasma buccale, Mycoplasma faecium, Mycoplasma felis, Mycoplasma fermentans, Mycoplasma genitalium, Mycoplasma hominis, Mycoplasma lipophilum, Mycoplasma orale, Mycoplasma penetrans, Mycoplasma pirum, Mycoplasma primatum, Mycoplasma salivarium, Mycoplasma spermatophilum, T Mycoplasmas, T strains, Ureaplasma parvum, Ureaplasma urealyticum. ICD9: 041.81 ICD10: A49.3

Mycoplasma pneumoniae infection

Agent	BACTERIUM. Mollicutes. <i>Mycoplasma pneumoniae</i>
Reservoir	Human
Vector	None
Vehicle	Droplet, Respiratory or pharyngeal acquisition
Incubation Period	6d - 23d
Diagnostic Tests	Culture (sputum, throat). Serology. Nucleic acid amplification.
Typical Adult Therapy	Erythromycin 500 mg PO BID X 2w. OR Azithromycin 1 g, followed by 500 mg PO daily X 5 days. OR Doxycycline 100 mg PO BID OR Levofloxacin 750 mg PO X 5d
Typical Pediatric Therapy	Azithromycin 10 mg/kg PO day 1; 5 mg/kg PO days 2 to 5 OR Erythromycin 10 mg/kg PO QID X 2w
Clinical Hints	Coryza, "hacking" cough and subsegmental pulmonary infiltrate Bullous otitis media is often present Most patients below age 30 Cold agglutinins are neither sensitive nor specific for infection, and appear only during second week.
Synonyms	Mycoplasma pneumoniae, Primary atypical pneumonia. ICD9: 041.81,483.0 ICD10: B96.0

Myiasis

Agent	PARASITE - Insecta (Diptera) larvae
Reservoir	Mammal
Vector	Arthropod
Vehicle	Fly eggs deposited by biting arthropod
Incubation Period	1w - 3m
Diagnostic Tests	Identification of extracted maggot.
Typical Adult Therapy	Removal of maggot
Typical Pediatric Therapy	As for adult
Clinical Hints	Fly larvae seen in various body regions Pruritic or painful draining nodule Fever and eosinophilia may be present Instances of brain, eye, middle ear and other deep infestations are described.
Synonyms	Calliphora, Chrysomya, Chrysomyia, Cochliomyia, Cordylobia, Cuterebrosis, Dermatobia, Eristalis, Furuncular myiasis, Gasterophilus, Hypoderma, Lucilia, Lund's fly, Maggot infestation, Megaselia, Musca, Muscina, Oedemagena, Oestrus larvae, Ophthalmomyiasis, Parasarcophaga, Psychoda, Rectal myiasis, Sarcophaga, Screw worm, Telmatoscopus, Urinary myiasis, Vaginal myiasis, Wohlfarthia. ICD9: 134.0 ICD10: B87

Necrotizing skin/soft tissue infx.

Agent	BACTERIUM. <i>Streptococcus pyogenes</i> , <i>Clostridium perfringens</i> , mixed anaerobic and/or gram-negative bacilli
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Clinical features. Smear and culture (including anaerobic culture) of exudate.
Typical Adult Therapy	Debridement and parenteral antibiotics directed by smear and culture results. Hyperbaric oxygen in more severe infections
Typical Pediatric Therapy	As for adult
Clinical Hints	At least 7 distinct syndromes are described Local pain and swelling, skin discoloration or edema Gas formation, foul odor and variable degrees of systemic toxicity.
Synonyms	Anaerobic cellulitis, Chancre oris, Clostridial cellulitis, <i>Clostridium novyi</i> , Fasciitis, Fournier's gangrene, Gangrenous cellulitis, Gangrenous stomatitis, Invasive group A strep. Infections, Meleney's synergistic gangrene, Necrotizing fasciitis, Noma, Streptococcal fasciitis, Synergistic necrotizing cellulitis. ICD9: 686.8,528.1 ICD10: M72.6,A69.0

Neutropenic typhlitis

Agent	BACTERIUM. <i>Clostridium septicum</i> (occasionally <i>Clostridium tertium</i> , <i>Clostridium sporogenes</i> , <i>Clostridium sordellii</i> or <i>Clostridium perfringens</i>)
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Unknown
Diagnostic Tests	Typical findings in the setting of neutropenia. Ultrasonography may be helpful.
Typical Adult Therapy	Broad spectrum antimicrobial coverage, which should include clostridia and <i>Pseudomonas aeruginosa</i> ; ie <i>Piperacillin / Tazobactam</i> (or <i>Imipenem</i> or <i>Meropenem</i>) OR <i>Cefepime + Metronidazole</i> Role of surgery is controversial
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, abdominal pain, diarrhea (occasionally bloody) and right lower quadrant signs in a neutropenic (leukemic, etc) patient; Infection may spread hematogenously to the extremities Case-fatality rate is 50% to 75%.
Synonyms	Neutropenic enterocolitis. ICD9: 540.0 ICD10: A04.8

Nipah virus infection

Agent	VIRUS - RNA. Mononegavirales Paramyxoviridae, Megamyxovirus (Henipavirus) - Nipah virus
Reservoir	Pig, Bat
Vector	Unknown
Vehicle	Fruit and sap contaminated by bat feces or urine, Respiratory or pharyngeal acquisition
Incubation Period	Unknown
Diagnostic Tests	Viral culture (brain tissue, urine, CSF, serum). Serology. Nucleic acid amplification. Biosafety level 4.
Typical Adult Therapy	Supportive. Ribavirin is reported to be effective in reducing mortality
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, headache, meningismus, encephalopathy and myoclonus, progressing to coma Follows contact with pigs Reported case-fatality rate is 32%.
Synonyms	Hendra-like, Nipah, Nipah-like virus. ICD9: 078.89 ICD10: B33.8

Although Nipah virus infection is not endemic to Madagascar, imported, expatriate or other presentations of the disease have been associated with this country.

Nipah virus infection in Madagascar

Seropositive pteropid bats (*Pteropus rufus* and *Eidolon dupreanum*) have been identified in Madagascar.¹

References

1. [Emerg Infect Dis](#) 2007 Jan ;13(1):159-61.

Nocardiosis

Agent	BACTERIUM. Actinomycetes, <i>Nocardia</i> spp. An aerobic gram positive bacillus (acid-fast using special technique)
Reservoir	Soil
Vector	None
Vehicle	Air, Dust, Wound, Contact, Respiratory or pharyngeal acquisition
Incubation Period	Days to weeks
Diagnostic Tests	Culture and gram stain of exudates, sputa, tissue specimens. Advise laboratory when <i>Nocardia</i> suspected.
Typical Adult Therapy	Lymphadenitis or skin / soft tissue: Sulfamethoxazole / Trimethoprim OR Minocycline Pneumonia: Sulfamethoxazole / Trimethoprim + Imipenem ; OR Imipenem + Amikacin Brain abscess: Sulfamethoxazole / Trimethoprim + Imipenem ; OR Linezolid + Meropenem
Typical Pediatric Therapy	As for adult
Clinical Hints	Pneumonia, lung abscess, brain abscess, or other chronic suppurative infection Often occurs in the setting of immune suppression.
Synonyms	<i>Nocardia</i> , Nocardiose. ICD9: 039 ICD10: A43

Onchocerciasis - zoonotic

Agent	PARASITE - Nematoda. Secernentea: <i>Onchocerca lupi</i> , et. al.
Reservoir	Cattle, Horse, Deer, Boar, Dog, Wolf
Vector	Black fly (<i>Simulium</i> spp.)
Vehicle	None
Incubation Period	Unknown
Diagnostic Tests	Ideentification of excised worm
Typical Adult Therapy	Excision
Typical Pediatric Therapy	As of adult
Clinical Hints	Subcutaneous or subconjunctival nodule, or eye-worm; may be history of animal contact
Synonyms	Dipetalonema arbuta, Dipetalonema sprenti, Onchocerca cervicalis, Onchocerca dewittei, Onchocerca guttarosa, Onchocerca jakutensis, Onchocerca lupi, Onchocerca reticulata, Pelecitus. ICD9: 123.8 ICD10: B71.1.

Orbital and eye infection

Agent	BACTERIUM OR FUNGUS. <i>Streptococcus pyogenes</i> , oral anaerobes, <i>Aspergillus</i> spp., facultative gram-negative bacilli, et al
Reservoir	Endogenous, Introduced flora (trauma, surgery)
Vector	None
Vehicle	Trauma, Surgery, Contiguous (sinusitis), Hematogenous
Incubation Period	Variable
Diagnostic Tests	Imaging techniques (CT or MRI). Culture of aspirates or surgical material.
Typical Adult Therapy	Local and systemic antimicrobial agents appropriate for species and severity
Typical Pediatric Therapy	As for adult
Clinical Hints	Proptosis, chemosis, extraocular palsy, or hypopyon Associated with sinusitis, bacteremia, eye trauma or surgery Infection may involve the eye (endophthalmitis); periosteum (peri orbital infection); orbit (orbital cellulitis); or multiple structures (panophthalmitis).
Synonyms	Bacterial keratitis, Ceratite, Cheratite, Endophthalmitis, Eye infection, Keratite, Keratitis, Orbital infection, Panophthalmitis, Queratitis. ICD9: 360.0 ICD10: H05.0

Orbital and eye infection in Madagascar

Notable outbreaks

Years	Region	Clinical	Notes
1984*	Antananarivo	conjunctivitis - acute hemorrhagic	1
1991		conjunctivitis - acute hemorrhagic	2
2012		conjunctivitis - acute hemorrhagic	

* indicates publication year (not necessarily year of outbreak)

References

1. Arch Inst Pasteur Madagascar 1984 ;51(1):145-51.
2. Rev Int Trach Pathol Ocul Trop Subtrop Sante Publique 1994 ;71:115-24.

Orf

Agent	VIRUS - DNA. Poxviridae, Parapoxvirus: Orf virus
Reservoir	Sheep, Goat, Reindeer, Musk ox
Vector	None
Vehicle	Contact, Secretions, Fomite, Cat-scratch
Incubation Period	3d - 6d (range 2d - 7d)
Diagnostic Tests	Viral culture (skin lesion or exudate). Serology. Nucleic acid amplification. Biosafety level 3.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Skin pustule or ulcer following contact with sheep or goats Most lesions are limited to finger or hand Heals without scarring within 6 weeks
Synonyms	Contagious ecthyma, Contagious pustular dermatitis, Ecthyma contagiosum, Ovine pustular dermatitis, Scabby mouth. ICD9: 078.89 ICD10: B08.0

Ornithosis

Agent	BACTERIUM. Chlamydiaceae, Chlamydiae , <i>Chlamydophila (Chlamydia) psittaci</i>
Reservoir	Parakeet, Parrot, Pigeon, Turkey, Duck, Cat, Sheep, Goat, Cattle, Dog
Vector	None
Vehicle	Bird droppings, Dust, Air, Aerosol from cat, Respiratory or pharyngeal acquisition
Incubation Period	7d - 14d (range 4d - 28d)
Diagnostic Tests	Serology. Culture (available in special laboratories) rarely indicated.
Typical Adult Therapy	Doxycycline 100 mg PO BID X 10d. Alternatives: Azithromycin 1 g, then 0.5 g daily X 4 days. Clarithromycin 0.5 g BID Erythromycin 500 mg PO QID X 10d. Levofloxacin 750 mg PO X 7 days
Typical Pediatric Therapy	Azithromycin 10 mg/kg PO day 1; 5 mg/kg PO days 2 to 5 OR Erythromycin 10 mg/kg QID X 10d Alternative (Age >=8 years): Doxycycline 100 mg PO BID X 10d.
Clinical Hints	Headache, myalgia and pneumonia, often with relative bradycardia Hepatomegaly or splenomegaly common Onset 1 to 4 weeks following contact with pigeons, psittacine birds or domestic fowl Case-fatality rate without treatment is 20%.
Synonyms	Chlamydophila abortus, Chlamydophila psittaci, Ornitose, Papegojsjuka, Parrot fever, Psitacosis, Psittacosis, Psittakose. ICD9: 073 ICD10: A70

Osteomyelitis

Agent	BACTERIUM OR FUNGUS. <i>Staphylococcus aureus</i> , facultative gram-negative bacilli, <i>Candida albicans</i> , etc
Reservoir	Endogenous
Vector	None
Vehicle	Trauma, Surgery, Hematogenous
Incubation Period	Variable
Diagnostic Tests	Radiography, including bone scan. Culture of biopsy material.
Typical Adult Therapy	Systemic antimicrobial agent(s) appropriate to known or suspected pathogen. Surgery as indicated
Typical Pediatric Therapy	As for adult
Clinical Hints	Limb pain or gait disturbance, often associated with obscure fever May be preceded by infection of skin, soft tissues or joint; or result from bacteremia X-ray changes are not apparent for at least 10 days in acute infection
Synonyms	Osteomielite, Osteomyelitis, Osteomyelite, Paravertebral abscess. ICD9: 015,730.9 ICD10: M86

Otitis media

Agent	BACTERIUM OR VIRUS. <i>Haemophilus influenzae</i> & <i>Streptococcus pneumoniae</i> in most acute cases; RSV, Parainfluenza, et al
Reservoir	Human
Vector	None
Vehicle	None
Incubation Period	Variable
Diagnostic Tests	Clinical findings. Culture of middle ear fluid if available.
Typical Adult Therapy	If evidence of bacterial infection (severe otalgia >48 hours / fever >39 C): Amoxicillin / Clavulanate 1000/62.5 mg BID X 3 days Alternatives: Cefdinir , Cefpodoxime proxtil, Cefprozin, fluoroquinolone
Typical Pediatric Therapy	If evidence of bacterial infection (severe otalgia >48 hours / fever >39 C): Amoxicillin / Clavulanate 45/3.2 mg/kg BID X 3 days
Vaccine	Pneumococcal conjugate vaccine
Clinical Hints	Acute bacterial otitis media often represents the final stage in a complex of anatomic, allergic or viral disorders of the upper airways Recurrent or resistant infections may require surgical intervention.
Synonyms	Otitis media aguda. ICD9: 382.0 ICD10: H65,H66

Otitis media in Madagascar

Vaccine Schedule:

BCG - birth
DTwPHibHepB - 6,10,14 weeks
IPV - 14 weeks
Measles - 9 months
OPV - birth; 6,10,14 weeks
Pneumo conj - 6,10,14 weeks
Rotavirus - 6,10 weeks
TT - 1st contact pregnancy; +1, +6 months; +1, +1 year

No cases were reported between and

Parainfluenza virus infection

Agent	VIRUS - RNA. Paramyxoviridae: Respirovirus - Human Parainfluenza virus 1 and 3. Rubulavirus - Human Parainfluenza virus 2 and 4.
Reservoir	Human
Vector	None
Vehicle	Droplet, Respiratory or pharyngeal acquisition
Incubation Period	3d - 8d
Diagnostic Tests	Viral culture (respiratory secretions). Serology. Nucleic acid amplification.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Upper respiratory infection - often croup or laryngitis Most common during infancy Older children develop a "cold-like" illness Complicated by pneumonia in 7% to 17% of cases
Synonyms	Parainfluenza, Sendai. ICD9: 078.89,480.2 ICD10: J12.2

Parainfluenza virus infection in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
1983	Antananarivo	children	30	30% of Malagasy children ages 6 days to 10 years, hospitalized with viral acute respiratory infection (Antananarivo, 1983) ¹
2012*	Southeast Region	children	11.8	11.8% of children ages 2 to 59 months with acute respiratory infection (southeastern Madagascar, 2012 publication) ²
2008 - 2009	Antananarivo	patients	5.2	5.2% of patients with influenza-like illness (Antananarivo, 2008 to 2009) ³

* indicates publication year (not necessarily year of survey)

References

1. Arch Inst Pasteur Madagascar 1986 ;52(1):147-55.
2. PLoS One 2012 ;7(8):e43666.
3. PLoS One 2011 Mar 03;6(3):e17579.

Parvovirus B19 infection

Agent	VIRUS - DNA. Parvoviridae, Parvovirinae: Erythrovirus B19
Reservoir	Human
Vector	None
Vehicle	Droplet, Breastfeeding, Respiratory or pharyngeal acquisition
Incubation Period	4d - 14d (range 3d - 21d)
Diagnostic Tests	Serology. Nucleic acid amplification (testing should be reserved for the rare instance of complicated infection).
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Erythema infectiosum (erythema of cheeks; lacelike or morbilliform rash on extremities) Febrile polyarthralgia Bone marrow aplasia/hypoplasia may be present
Synonyms	Duke's disease, Erythema infantum febrile, Erythema infectiosum, Erythema simplex marginatum, Erythrovirus B19, Erythrovirus B19, Fifth disease, Fourth disease, Funfte Krankheit, Parascarlatina, Parvovirus 4, Parvovirus B19, Sticker's disease. ICD9: 057.0 ICD10: B08.3

Pediculosis

Agent	PARASITE - Insecta. Anoplura: <i>Pediculus humanus</i> , <i>Phthirus pubis</i> .
Reservoir	Human
Vector	Louse
Vehicle	Contact
Incubation Period	7d
Diagnostic Tests	Identification of adults and "nits."
Typical Adult Therapy	Permethrin 1%; or malathion 0.5%; or lindane OR Ivermectin 200 mcg/kg PO
Typical Pediatric Therapy	Permethrin 1%; or malathion 0.5%; or lindane OR Ivermectin 200 mcg/kg PO (> 15 kg body weight)
Clinical Hints	Pruritus in the setting of poor personal hygiene Adult insects or nits may be visible The body louse (<i>Pediculus humanus</i> var. <i>corporis</i> ; rarely not the head louse) transmits such diseases as epidemic typhus, trench fever and relapsing fever
Synonyms	Crab louse, Lausebefall, Pediculose, <i>Pediculus capitus</i> , <i>Pediculus corporis</i> , Pedikulose, <i>Phthirus pubis</i> , Pidocci. ICD9: 132 ICD10: B85

Pentastomiasis - Linguatula

Agent	PARASITE - Pentastomid worm. <i>Linguatula serrata</i>
Reservoir	Herbivore
Vector	None
Vehicle	Meat (liver or lymph nodes of sheep/goat)
Incubation Period	Unknown
Diagnostic Tests	Identification of larvae in nasal discharge.
Typical Adult Therapy	No specific therapy available
Typical Pediatric Therapy	As for adult
Clinical Hints	Pharyngeal or otic itching Cough, rhinitis or nasopharyngitis which follows ingestion of undercooked liver.
Synonyms	Linguatula, Marrara syndrome. ICD9: 128.8 ICD10: B83.8

Pericarditis - bacterial

Agent	BACTERIUM. <i>Streptococcus pneumoniae</i> , <i>Staphylococcus aureus</i> , et al
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Ultrasonography and cardiac imaging techniques. Culture of pericardial fluid (include mycobacterial culture).
Typical Adult Therapy	Antimicrobial agent(s) appropriate to known or anticipated pathogen. Drainage as indicated
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, chest pain and dyspnea Patients are acutely ill and have overt signs such as venous distention Enlarged cardiac "shadow"; concurrent pneumonia or upper respiratory infection may be present The case-fatality rate is 20%.
Synonyms	Bacterial pericarditis, Pericardite. ICD9: 074.23,074.2,115.03,420 ICD10: I30

Perinephric abscess

Agent	BACTERIUM OR FUNGUS. <i>Escherichia coli</i> , other facultative gram negative bacilli, <i>Candida albicans</i> , et al
Reservoir	Human
Vector	None
Vehicle	None
Incubation Period	Variable
Diagnostic Tests	Urine and blood culture. Renal imaging (CT, etc).
Typical Adult Therapy	Antimicrobial agent(s) appropriate to known or anticipated pathogen. Surgery as indicated
Typical Pediatric Therapy	As for adult
Clinical Hints	Unexplained fever, leukocytosis and flank pain Patients are typically over age 50, and often diabetic Consider in the patient with nonresponsive "pyelonephritis" or a renal mass
Synonyms	

Perirectal abscess

Agent	BACTERIUM. Various (often mixed anaerobic and aerobic flora)
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Culture of drainage material.
Typical Adult Therapy	Surgical drainage and antibiotics effective against fecal flora
Typical Pediatric Therapy	As for adult
Clinical Hints	Anal or perianal pain with fever and a tender mass Granulocytopenic patients commonly develop small, soft and less overt abscesses - often due to <i>Pseudomonas aeruginosa</i> .
Synonyms	

Peritonitis - bacterial

Agent	BACTERIUM. Various (often mixed anaerobic and aerobic flora)
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Culture of blood and peritoneal fluid. Peritoneal fluid cell count may also be useful.
Typical Adult Therapy	Antimicrobial agent(s) appropriate to known or anticipated pathogens. Surgery as indicated
Typical Pediatric Therapy	As for adult
Clinical Hints	Abdominal pain and tenderness Vomiting, absent bowel sounds, guarding and rebound Diarrhea may be present in children Underlying visceral infection or perforation, trauma, hepatic cirrhosis (spontaneous peritonitis) etc.
Synonyms	Acute peritonitis, Bacterial peritonitis, Peritonite. ICD9: 567 ICD10: K65

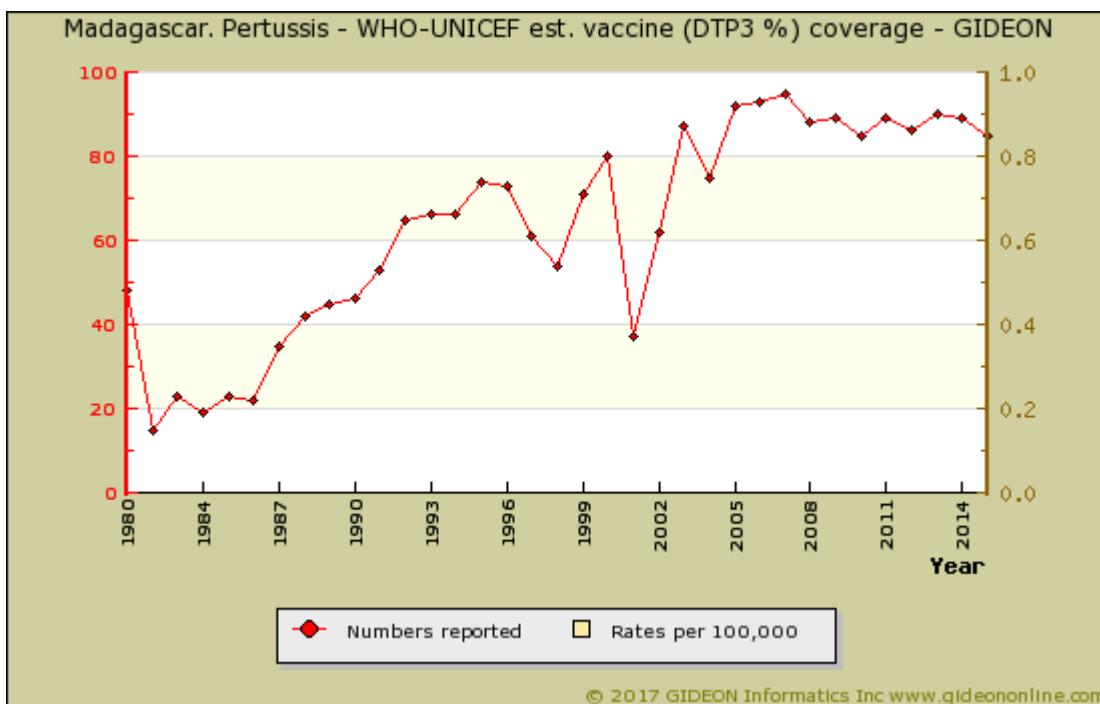
Pertussis

Agent	BACTERIUM. <i>Bordetella pertussis</i> An aerobic gram-negative coccobacillus
Reservoir	Human
Vector	None
Vehicle	Air, Infected secretions, Respiratory or pharyngeal acquisition
Incubation Period	7d - 10d (range 5d - 21d)
Diagnostic Tests	Culture & direct fluorescence (nasopharynx). Alert laboratory when suspected. Serology.
Typical Adult Therapy	Respiratory precautions. <i>Azithromycin</i> 500 mg po X 1, then 250 mg daily X 4 days OR <i>Clarithromycin</i> 500 mg po BID X 7 days OR Sulfamethoxazole / <i>Trimethoprim</i>
Typical Pediatric Therapy	Respiratory precautions: <i>Azithromycin</i> 10mg /kg po daily for 5 days OR <i>Clarithromycin</i> 15/mg/kg BID X 7 days OR Sulfamethoxazole / <i>Trimethoprim</i>
Vaccines	DTaP vaccine DTP vaccine
Clinical Hints	Coryza, paroxysmal cough May be associated with pneumonia or otitis Prominent lymphocytosis Most often diagnosed in young children, but may present as indolent cough in adults Epistaxis and subconjunctival hemorrhage often noted Seizures (below age 2) The case-fatality rate is 0.5%.
Synonyms	<i>Bordetella holmesii</i> , <i>Bordetella parapertussis</i> , <i>Bordetella pertussis</i> , Coqueluche, Keuchhusten, Kikhosta, Kikhoste, Kinkhoest, Parapertussis, Pertosse, Syndrome coqueluchoide, Tos convulsa, Tos farina, Tosse convulsa, Tussis convulsa, Whooping cough. ICD9: 033 ICD10: A37

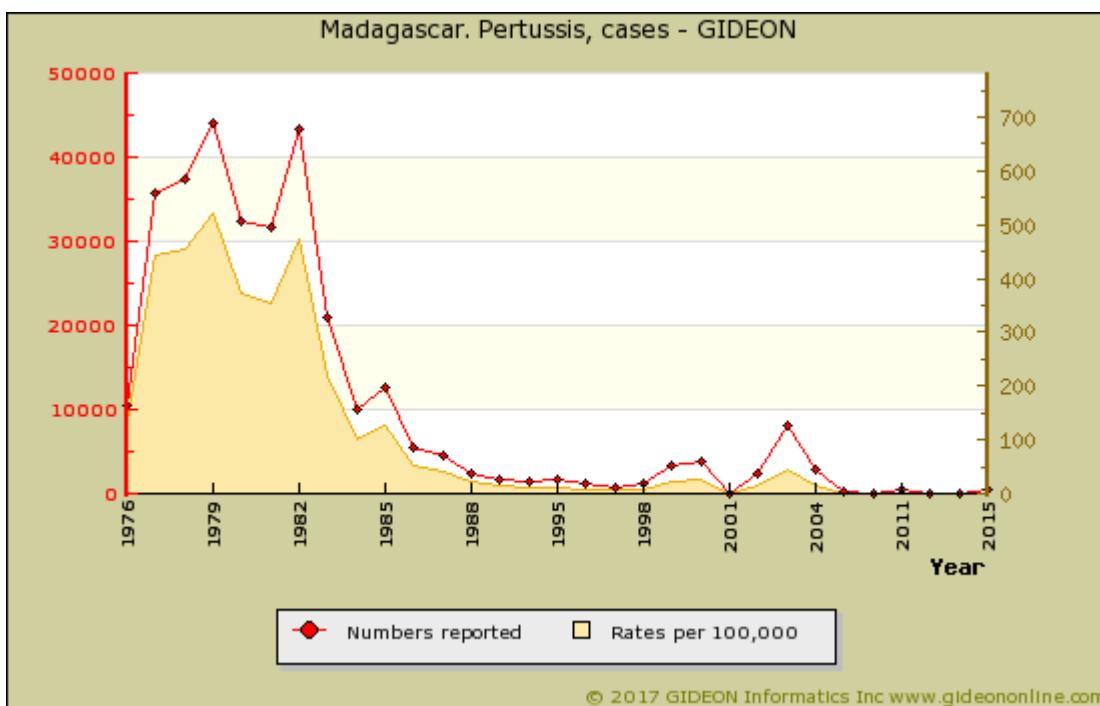
Pertussis in Madagascar

Vaccine Schedule:

BCG - birth
DTwPHibHepB - 6,10,14 weeks
IPV - 14 weeks
Measles - 9 months
OPV - birth; 6,10,14 weeks
Pneumo conj - 6,10,14 weeks
Rotavirus - 6,10 weeks
TT - 1st contact pregnancy; +1, +6 months; +1, +1 year



Graph: Madagascar. Pertussis - WHO-UNICEF est. vaccine (DTP3 %) coverage



Graph: Madagascar. Pertussis, cases

Pharyngeal and cervical space infx.

Agent	BACTERIUM. <i>Streptococcus pyogenes</i> , mixed oral anaerobes, etc.
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Careful examination of region and X-ray (or CT scan). Smear and culture of pus if available.
Typical Adult Therapy	Surgical drainage and parenteral antibiotics effective against oral flora
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, painful swelling and displacement of the tongue, fauces and other intraoral structures; Dysphagia, dyspnea or jugular phlebitis may ensue in more virulent infections.
Synonyms	Cervical space infection, descending necrotizing mediastinitis, Lemmier's syndrome, Ludwig's angina, Post-anginal septicemia, Quinsy. ICD9: 682.0,682.1 ICD10: J36,J39.0,J39.1

Pharyngitis - bacterial

Agent	BACTERIUM. Most often <i>Streptococcus pyogenes</i> ; <i>Streptococcus</i> groups B, C, F and G are occasionally isolated
Reservoir	Human
Vector	None
Vehicle	Droplet, Rarely food, Respiratory or pharyngeal acquisition
Incubation Period	1d - 5d
Diagnostic Tests	Throat swab for culture or antigen detection (group A Streptococcus) ASLO titer may not indicate current infection
Typical Adult Therapy	Penicillin G or Penicillin V or other antistreptococcal antibiotic to maintain serum level for 10 days
Typical Pediatric Therapy	As for adult
Clinical Hints	Purulent pharyngitis and cervical lymphadenopathy usually indicate streptococcal etiology Viruses (mononucleosis, Enteroviruses) and other bacteria (gonorrhea, diphtheria) should also be considered
Synonyms	Acute pharyngitis, Bacterial pharyngitis, Mal di gola batterica, Oral thrush, Streptococcal pharyngitis, Tonsillitis - bacterial, Vincent's angina. ICD9: 034.0,462 ICD10: J02,J03

Philophthalmosis

Agent	PARASITE - Platyhelminthes, Trematoda. <i>Philophthalmus gralli</i> , <i>Ph. lucipetus</i> , <i>Ph. lacrimosus</i>
Reservoir	Snail
Vector	None
Vehicle	Aquatic plants
Incubation Period	Unknown Less than 24 hours in birds
Diagnostic Tests	Identification of excised worm
Typical Adult Therapy	Removal of worm
Typical Pediatric Therapy	As for adult
Clinical Hints	Conjunctivitis, lacrimation and the presence of an adult worm in the conjunctival sac
Synonyms	Oriental avian eye fluke, Oriental eye fluke, <i>Philophthalmus</i> . ICD9: 121.8 ICD10: b66.8

Pityriasis rosea

Agent	UNKNOWN. Human herpesvirus 7 has been implicated
Reservoir	Unknown
Vector	Unknown
Vehicle	Unknown
Incubation Period	Unknown
Diagnostic Tests	Clinical features.
Typical Adult Therapy	Supportive; ultraviolet B exposure is suggested Acyclovir 400 mg PO TID X 7 days has been used in severe cases
Typical Pediatric Therapy	Supportive; ultraviolet B exposure is suggested
Clinical Hints	Herald patch followed by crops of pruritic, salmon-colored macules and papules Systemic symptoms are rare Illness resolves after 3 to 8 weeks
Synonyms	

Plague

Agent	BACTERIUM. <i>Yersinia pestis</i> A facultative gram-negative bacillus
Reservoir	Rodent, Rabbit, Cat, Dog, Wild carnivore
Vector	Flea (<i>Pulex; Xenopsylla</i>)
Vehicle	Air, Contact, Respiratory or pharyngeal acquisition
Incubation Period	2d - 7d (range 1d - 14d)
Diagnostic Tests	Culture (blood, sputum, pus). Fluorescent (DFA) staining of pus. Nucleic acid amplification.
Typical Adult Therapy	Strict isolation. Gentamicin 2 mg/kg IV loading dose, then 1.7 mg/kg Q8h. OR Streptomycin 15 mg/kg q12h X 10d. OR Doxycycline 100 mg PO BID X 10d. OR Chloramphenicol 20 mg/kg PO QID
Typical Pediatric Therapy	Gentamicin 2 mg/kg IV loading dose, then 1.7 mg/kg Q8h OR Streptomycin 10 mg/kg q8h X 10d. OR Chloramphenicol 15 mg/kg PO QID X 10d
Vaccine	Plague vaccine
Clinical Hints	Suppurative lymphadenitis with septicemia Hemorrhagic pneumonia in some cases History of rodent contact or exposure to other cases Case-fatality rates for bubonic plague without therapy are 50% to 60%
Synonyms	Black death, Black plague, Bubonic plague, Glandular plague, Hemorrhagic plague, Peste, Pneumonic plague, Saint Roch's disease, <i>Yersinia pestis</i> . ICD9: 020 ICD10: A20

Plague in Madagascar

Plague was first reported in port areas of Madagascar in 1898; with later spread to the high plateau in 1921. [1](#) [2](#) [3](#)

Disease rates peak during January to February and November to December. [4](#)

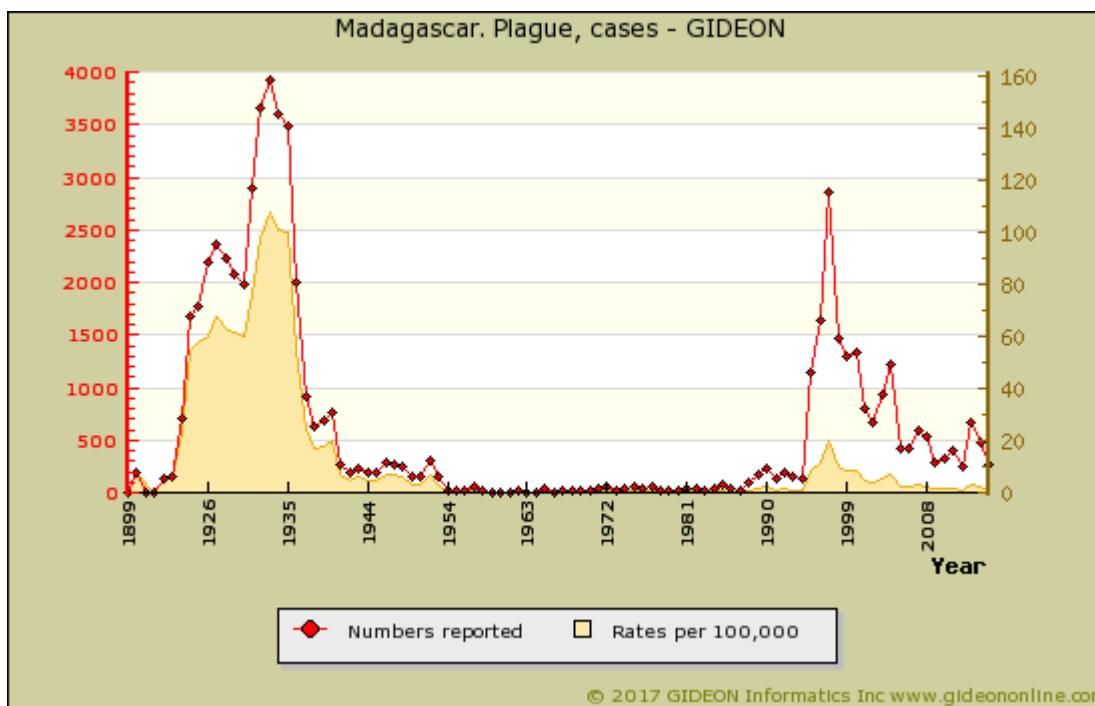
In recent years plague has been reported from: [5](#) [6](#)

Antananarivo Province
 Ambohidratrimo S. Pref
 Antananarivo-Varadrano S. Pref.
 Ambatolampy S. Pref.
 Anjozorobe S. Pref.
 Antananarivo S. Pref.:
 Antananarivo District
 Antanifotsy S. Pref.
 Antsirabe I S. Pref.
 Antsirabe II S. Pref:
 Ambodiala District
 Ambohitsimanova District
 Ampasatanety District
 Manandona District
 Soanindrariny District
 Tsarofer District
 Vinaninkarena District
 Arivonimamo S. Pref.
 Antsiranana region.
 Betafo S. Pref.:
 Alakamisy-Anativato District

Fanandriana S. Pref.
Faratsihy S. Pref.
Manjakandriana S. Pref.
Miarinarivo S. Pref.:
 Analavory District
 Anosibe Ifanja District
Renivohitra S. Pref.
Soavinandriana S. Pref:
 Ambatoasana Centre
Tsiroanomandidy S. Pref.
Antsiranana Province
Andapa S. Pref.:
 Doany District
Fianarantsoa Province
Ambatofinandrahana S. Pref.:
 Ambondromistoatra District
 Bevonotany District
 Soaniherenana District
Ambohimahasoa S. Pref:
 Manandroy District
Ambositra S. Pref.:
 Ambatomarina District
 Ambohimahazo District
 Ambovombe Centre
 Andina District
 Anjoma N'Ankona District
 Anjoma Navona District
 Ankazoambo District
 Ivato District
 Ivony District
 Talata-Vohimena District
 Tsarasaotra District
Fandriana S. Pref.:
 Fiadanana District
Fianarantsoa I. S. Pref.:
 Mahatsinjo District
Fianarantsoa II. S. Pref.:
 Andohanaromaitso District
 Fianarantsoa II District
Manandriana S. Pref
Majunga (Makajanga) Province
Toamasina Province
Moramanga S. Pref.

Historical:

- Plague was first described in Madagascar in 1898, with cases in the harbor of Tamatave (Toamasina). ⁷
- The first epidemic occurred in Majunga in 1902 (142 fatal cases during May to July of that year).
- A second outbreak in this town during July to October 1907 claimed 49 lives, with subsequent outbreaks in 1924 and 1928.
- The disease reached the central highlands in 1921, and remains endemic to this area at elevations above 800 m. ⁸
- Outbreaks of pneumonic plague were reported during 1921 to 1935; and in 1957 (northeast region).



Graph: Madagascar. Plague, cases

Notes:

1. Data include suspected or confirmed cases
2. 10,471 cases were reported during 1935 to 1949. [9](#) [10](#); 9,227 (448 fatal) during 1957 to 1986; 5,896 (493 fatal) during 1980 to 1997; 11,673 (950 fatal) during 1987 to 2001; 5,927 (1,337 confirmed) during 1989 to 1995. [11](#)
3. During 1989 to 1992, 93% of cases were reported from "the plague triangle" located in the Central Highlands and delimited by Ambatondrazaka, Miarinarivo and Fianarantsoa. [12](#)
4. During 1984 to 1998, Madagascar accounted for 45% of plague cases in Africa. [13](#)
5. Approximately 50% of suspect plague cases are notified from Ambositra - 0.6% of the population in this region are seropositive.
6. 1,702 suspected cases (515 confirmed, 47 fatal) were reported in Mahajanga during 1995 to 1998. [14](#)
7. Reviews of plague in Madagascar - see references [15](#) [16](#) [17](#)

Individual years:

1995 - Included 221 cases in the northeast coast (Mahajanga Province). [18](#) [19](#) [20](#)

1997 - 58.2% of the world total. Data included an outbreak of pneumonic plague (18 cases, 7 fatal) in Antsapandrano Municipality. [21](#)

1998 - 59.8% of the world total. [22](#)

1999 - 50.1% of the world total.

2000 - 56.2% of the world total. [23](#)

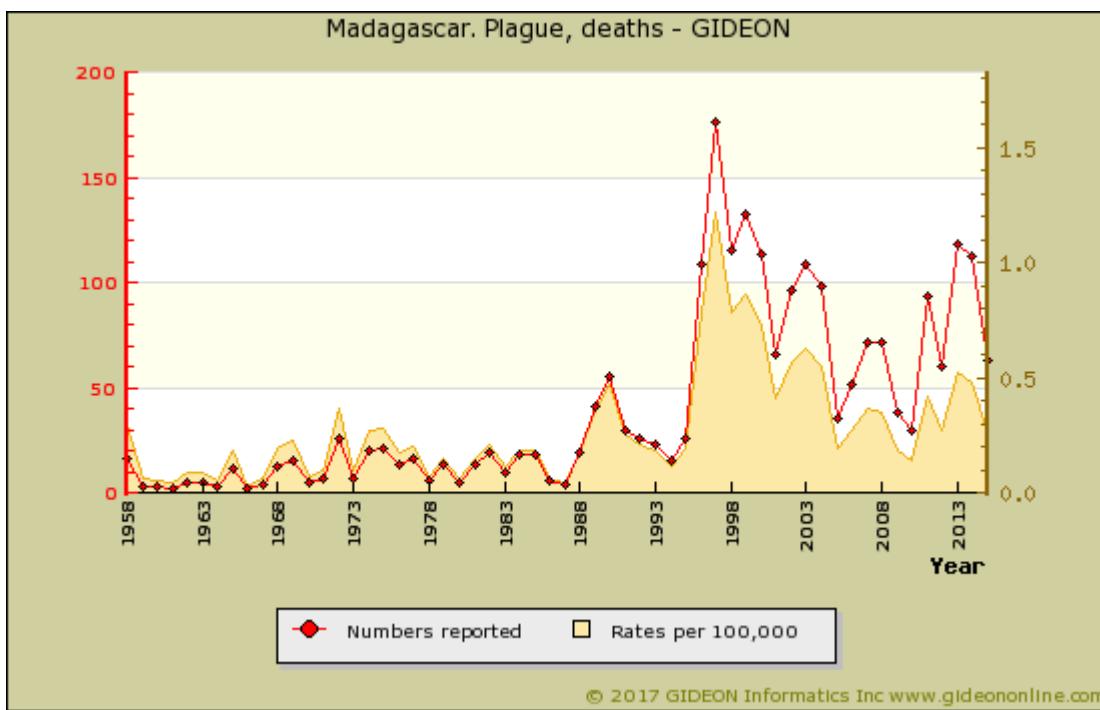
Of 5,927 suspected cases reported during 1989 to 1995, 1,337 were bacteriologically-confirmed, with a case-fatality rate of 19%. [24](#)

- 91.3% of these cases were characterized as bubonic (67.8% of these involving the inguinal region).

Seroprevalence surveys

Years	Region	Study Group	%	Notes
1997*	Majanga City	general population	1.5-15.5	<1.5% to 15.5% in Majanga City (1997 publication) 25
1999	Mahajanga	general population	0.61	0.61% of individuals in Mahajanga (anti-F1 antibody, 1999) 26
1999	Antananarivo	workers	3.2	3.2% of market vendors in Antananarivo (anti-F1 antibody, 1999) 27

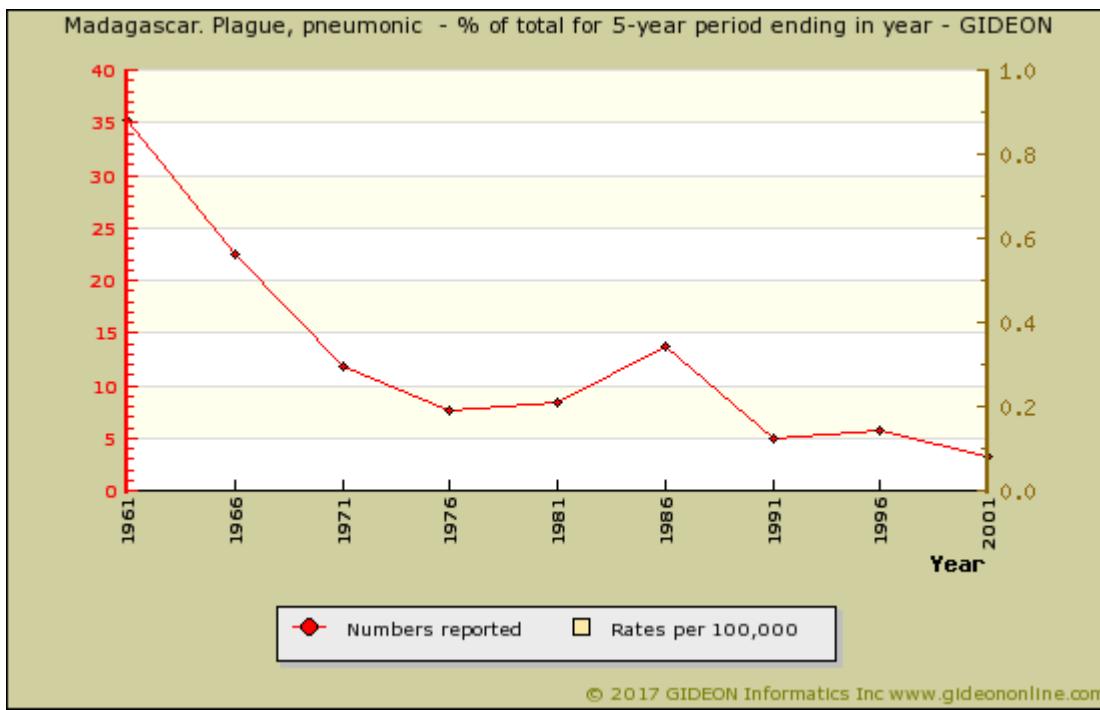
* indicates publication year (not necessarily year of survey)



Graph: Madagascar. Plague, deaths

Notes:

1. Since the 1980's, Africa - notably Madagascar - has accounted for most of the world's plague deaths. [28](#)



Graph: Madagascar. Plague, pneumonic - % of total for 5-year period ending in year

A single isolate of extensively multi-resistant *Yersinia pestis* was isolated in Ambalavao District in 1995.

Reservoirs implicated in transmission include the shrews (*Suncus murinus*) and rats (*Rattus rattus*). [29](#)

- Infection has also been identified in hedgehogs (*Tenrec ecaudatus*). [30](#)

Possible flea vectors include *Paractenopsyllus pauliani*, *Synopsyllus fonquerneiei* and *Xenopsylla cheopis*.

- *Yersinia pestis* was identified in *Pulex irritans* fleas in Ambatofinandrana (2013). [31](#)

Notable outbreaks

Years	Region	Setting	Cases	Deaths	Clinical	Notes
1902	Majunja			142		142 fatal cases during May to July
1907	Majunja			49		
1957	Northeast Region				pneumonic plague	32 33 34
1958*	Northeast Region				pneumonic plague	35
1982*	Tananarive		9			36
1991	Majunga					37
1995	Mahajanga		108			38 39 40
1997			2,863	176		41 42
1998	Ikongo	hamlet				43
2008	Toamasina			7		44
2010	La Libertad		31	1		45
2011	multiple locations		200	60		Included outbreaks in Antananarivo (3 fatal cases) and Antsiranana (16 fatal cases). 46 47 48 49 50 51
2012	Bongolava		43	5		52
2013			86	42	pneumonic plague	53 54 55
2013	Ambatofinandrana		12			9 suspect and 3 confirmed cases. 56
2014 - 2015	multiple locations		308	81		Outbreak involved 16 districts of seven regions. 13 cases were registered in Antananarivo district. 57 58 59 60 61 62 63
2015			174			64
2015	Alaotra-Mangoro		14	10	pneumonic plague	65 66
2016	Befotaka Atsimo			31		67

* indicates publication year (not necessarily year of outbreak)

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Plesiomonas infection

Agent	BACTERIUM. <i>Plesiomonas shigelloides</i> A facultative gram-negative bacillus
Reservoir	Fish Animal, Soil, Reptile, Bird
Vector	None
Vehicle	Water, Food
Incubation Period	1d - 2d
Diagnostic Tests	Stool culture - alert laboratory when this organism is suspected. Nucleic acid amplification.
Typical Adult Therapy	Stool precautions. Ciprofloxacin 400 mg IV or 750 mg PO, BID Alternatives: Sulfamethoxazole / Trimethoprim , Amoxicillin / Clavulanate , Ceftriaxone
Typical Pediatric Therapy	Stool precautions. Sulfamethoxazole / Trimethoprim , Amoxicillin / Clavulanate , Ceftriaxone
Clinical Hints	Fever, abdominal pain, vomiting and severe diarrhea Symptoms often persist for 2 to 4 weeks In many cases, follows ingestion of shellfish or recent travel to developing countries
Synonyms	Plesiomonas shigelloides. ICD9: 008.8 ICD10: A04.8

Plesiomonas infection in Madagascar

Sporadic case reports and case series are published. ¹

References

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Pleurodynia

Agent	VIRUS - RNA. Picornaviridae: Coxsackievirus
Reservoir	Human
Vector	None
Vehicle	Air, Fecal-oral, Fomite, Respiratory or pharyngeal acquisition
Incubation Period	3d - 5d
Diagnostic Tests	Viral culture (throat, stool). Serology. Nucleic acid amplification.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	A late summer illness in temperate regions Sore throat followed by pleuritic chest pain Pain is often recurrent and appears in "waves" - local pressure on affected area may elicit the pain Usually resolves within one week.
Synonyms	Balme disease, Bamble disease, Bamie disease, Bornholm disease, Devil's grip, Drangedal disease, Epidemic benign dry pleurisy, Epidemic myalgia, Sylvest's disease. ICD9: 074.1 ICD10: B33.0

Pneumocystis pneumonia

Agent	FUNGUS. Ascomycota, Archiascomycetes, Pneumocystidales: <i>Pneumocystis jiroveci</i> (now distinct from <i>Pneumocystis carinii</i>)
Reservoir	Human
Vector	None
Vehicle	Air, Respiratory or pharyngeal acquisition
Incubation Period	4d - 8w
Diagnostic Tests	Identification of organisms in induced sputum, bronchial washings, tissue. Serology. Nucleic acid amplification.
Typical Adult Therapy	Therapy: Sulfamethoxazole / Trimethoprim 25 mg/5 mg/kg QID X 14d. OR Pentamidine 4 mg/kg/d X 14d. OR Dapsone + Trimethoprim . OR Atovaquone OR Primaquine + Clindamycin Prophylaxis - similar, but at altered dosage. Dapsone also used.
Typical Pediatric Therapy	Therapy: Sulfamethoxazole / Trimethoprim 25 mg/5 mg/kg QID X 14d. OR Pentamidine 4 mg/kg/d X 14d. OR Dapsone + Trimethoprim . OR Atovaquone OR Primaquine + Clindamycin Prophylaxis - similar, but at altered dosage.
Clinical Hints	Dyspnea, hypoxia and interstitial pneumonia Usually encountered in the setting of severe immune suppression (AIDS, leukemia, etc) Roentgenographic findings (typically bilateral alveolar pattern) may appear only after several days of illness
Synonyms	PCP, <i>Pneumocystis carinii</i> , <i>Pneumocystis jiroveci</i> . ICD9: 136.3 ICD10: B59

Pneumonia - bacterial

Agent	BACTERIUM. <i>Streptococcus pneumoniae</i> , <i>Klebsiella pneumoniae</i> ssp <i>pneumoniae</i> , other aerobic and facultative gram negative bacilli, etc.
Reservoir	Human
Vector	None
Vehicle	Droplet, Endogenous, Respiratory or pharyngeal acquisition
Incubation Period	1d - 3d
Diagnostic Tests	Culture of sputum, blood. Analyze ("grade") sputum cytology to assess significance of culture.
Typical Adult Therapy	Antimicrobial agent(s) appropriate to known or suspected pathogen
Typical Pediatric Therapy	As for adult
Vaccine	Pneumococcal vaccine
Clinical Hints	Rigors, pleuritic pain, hemoptysis, lobar infiltrate and leukocytosis Empyema and lung abscess suggest etiology other than pneumococcus Foul sputum with mixed flora may herald anaerobic (aspiration) pneumonia
Synonyms	Bacterial pneumonia, Empiema, Empyeem, Empyem, Empyeme, Empyeme, Lung abscess, Neumonia, Pleurisy, Pneumococcal infection - invasive, Pneumococcal pneumonia, Polmonite batterica, <i>Streptococcus pneumoniae</i> , <i>Streptococcus pneumoniae</i> - invasive. ICD9: 481,482,483,484 ICD10: J13,J14,J15,J17,J18,J85,J86

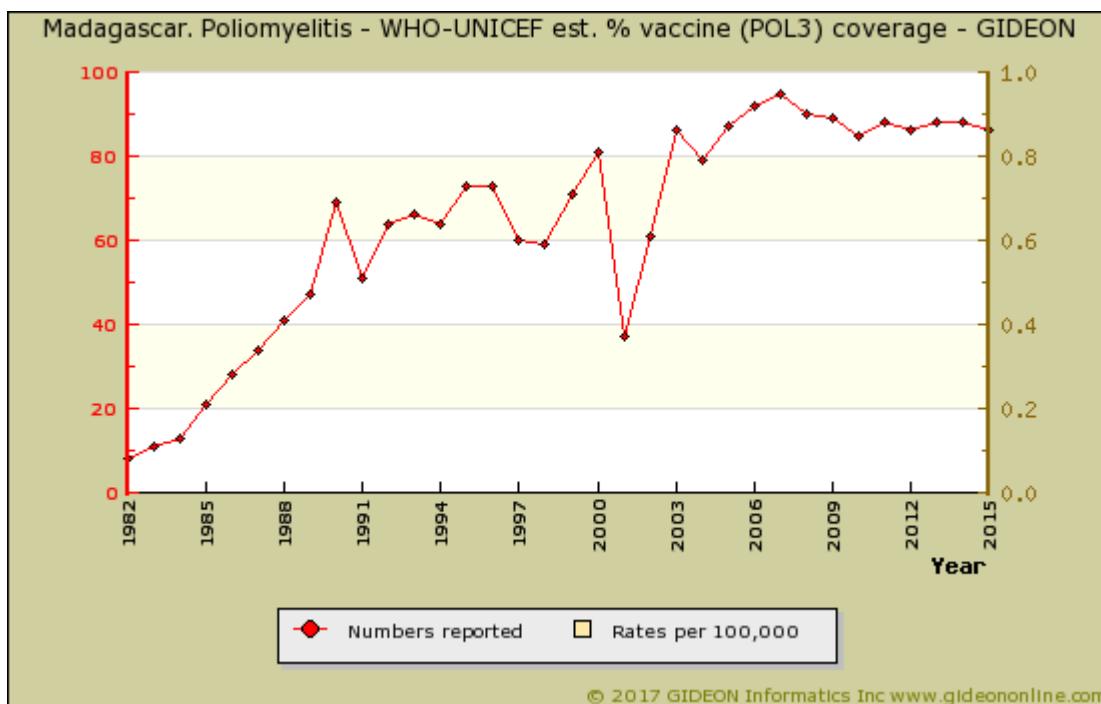
Poliomyelitis and acute flaccid paralysis

Agent	VIRUS - RNA. Picornaviridae, Picornavirus: Polio virus
Reservoir	Human
Vector	None
Vehicle	Fecal-oral, Dairy products, Food, Water, Fly, Respiratory or pharyngeal acquisition
Incubation Period	7d - 14d (range 3d - 35d)
Diagnostic Tests	Viral culture (pharynx, stool). Serology. Nucleic acid amplification.
Typical Adult Therapy	Stool precautions; supportive
Typical Pediatric Therapy	As for adult
Vaccines	Poliomyelitis - injectable vaccine Poliomyelitis - oral vaccine
Clinical Hints	Sore throat, headache, vomiting and myalgia followed by flaccid paralysis Meningeal involvement in 1% of cases - paralysis in only 0.1% Paralysis tends to be more extensive in adult patients
Synonyms	Acute flaccid paralysis, Heine-Medin disease, Infantile paralysis, Kinderlahmung, Kinderverlamming, Paralisi infantile, Paralisis flaccida, Paralisis flacida aguda, PFA (Paralisis Flacidas Agudas), Polio, Poliomyelite, Poliomyelitt. ICD9: 045 ICD10: A80

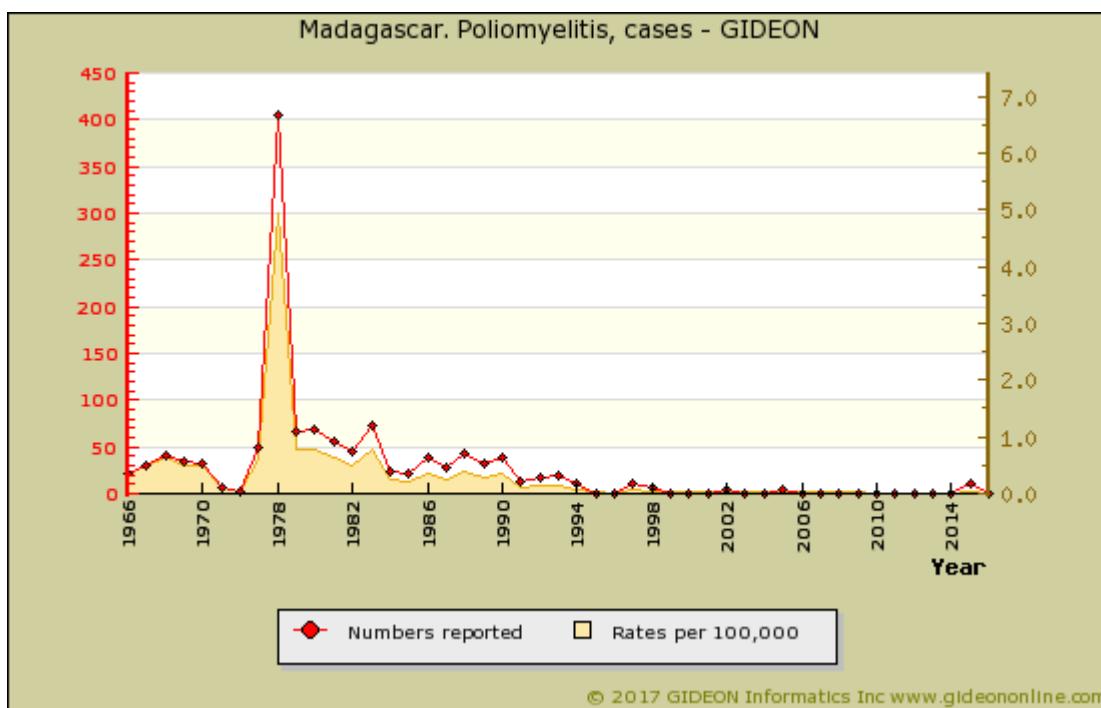
Poliomyelitis and acute flaccid paralysis in Madagascar

Vaccine Schedule:

BCG - birth
DTwPHibHepB - 6,10,14 weeks
IPV - 14 weeks
Measles - 9 months
OPV - birth; 6,10,14 weeks
Pneumo conj - 6,10,14 weeks
Rotavirus - 6,10 weeks
TT - 1st contact pregnancy; +1, +6 months; +1, +1 year



Graph: Madagascar. Poliomyelitis - WHO-UNICEF est. % vaccine (POL3) coverage



Graph: Madagascar. Poliomyelitis, cases

Notes:

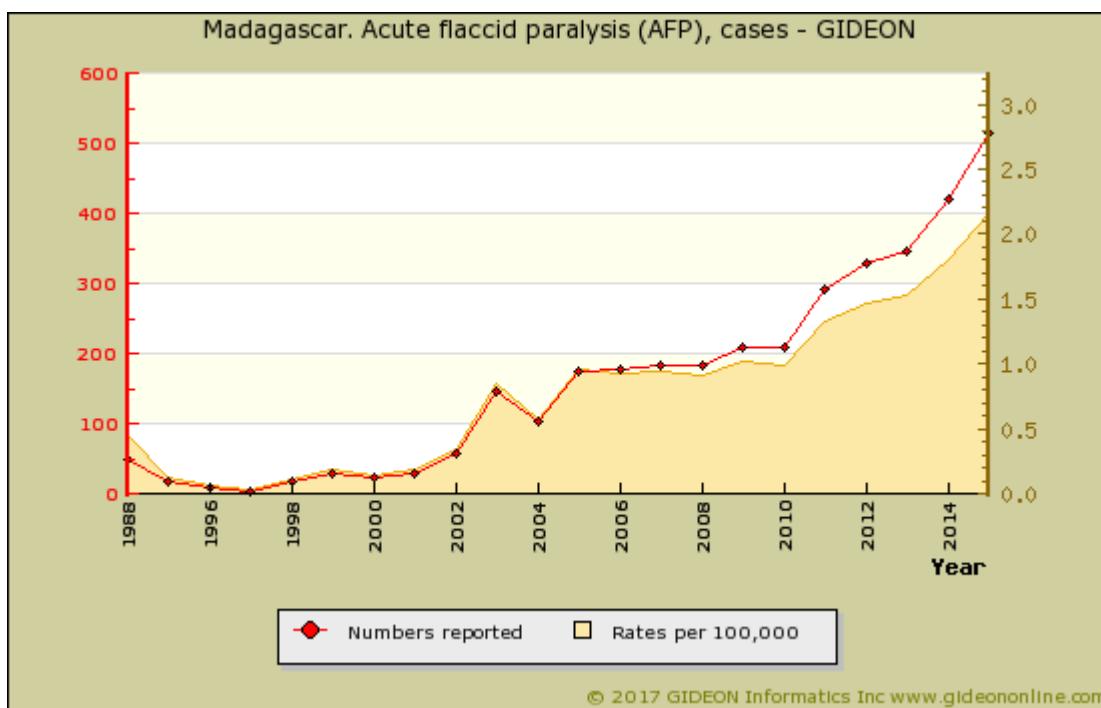
Individual years:

1997 - One due to wild virus.

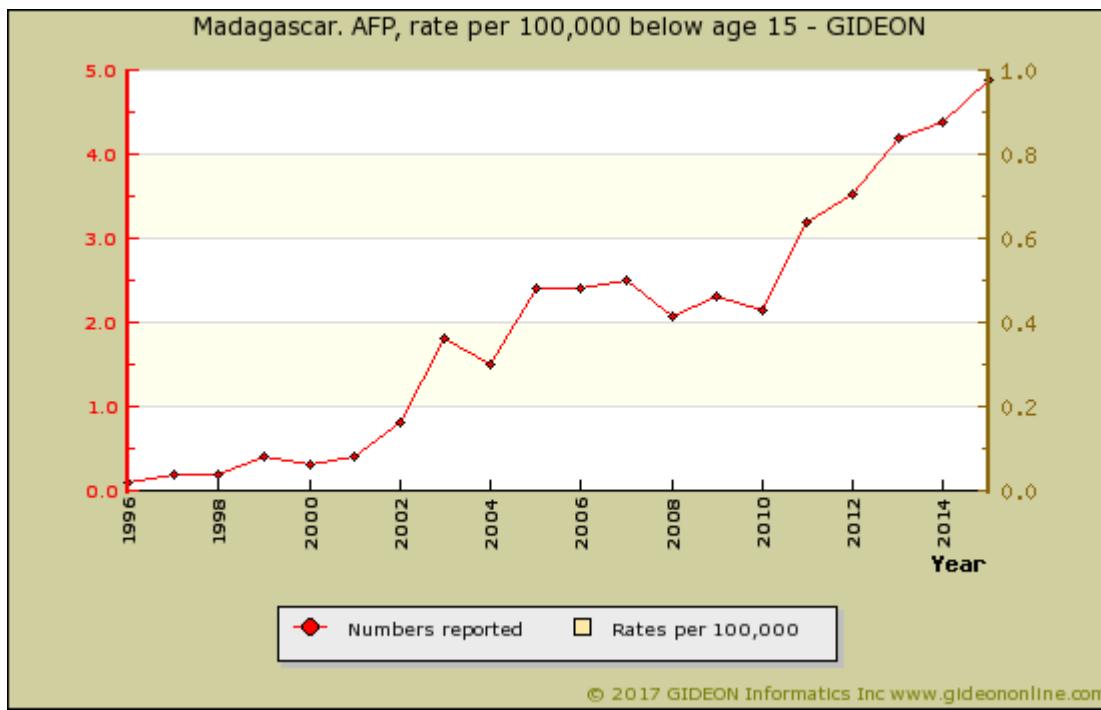
1998 - None due to wild virus.

2002 - A cluster of type 2 vaccine associated poliomyelitis was reported in Tolagnaro district (Toliara province, southeastern Madagascar). [1](#) [2](#)2005 - Two cases of vaccine-associated poliomyelitis were reported in southern Madagascar. [3](#)2014 - Included 1 case of vaccine-derived poliomyelitis. [4](#)

2015 - 24 cases of vaccine-derived poliomyelitis were reported worldwide to July - 10 of these in Madagascar.



Graph: Madagascar. Acute flaccid paralysis (AFP), cases



Graph: Madagascar. AFP, rate per 100,000 below age 15

Notable outbreaks

Years	Region	Cases	Pathogen	Notes
2002	Toliara	4	Poliovirus 2 vaccine-derived	5 6 7

Years	Region	Cases	Pathogen	Notes
2005	Toliara	5		8 9 10
2011	Toliara	6	Poliovirus vaccine-derived	11
2014 - 2015		11	Poliovirus vaccine-derived	12 13 14

References

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2. Wkly Epidemiol Rec 2002 Jul 19;77(29):241-2.
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8. MMWR Morb Mortal Wkly Rep 2006 Oct 13;55(40):1093-7.
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12. MMWR Morb Mortal Wkly Rep 2016 Feb 12;65(5):128-9.
13. ProMED <promedmail.org> archive: 20141115.2954054
14. ProMED <promedmail.org> archive: 20150908.3630921

Protothecosis and chlorellosis

Agent	ALGA. <i>Prototheca wickerhamii</i> ; rarely <i>Pr. zopfii</i> , <i>Pr. cutis</i> Achloric algae Chlorella spp. contain chloroplasts
Reservoir	Rare animal pathogens (cat, dog, cattle wild mammals).
Vector	None
Vehicle	Water, Sewage, Food, Skin trauma
Incubation Period	Unknown
Diagnostic Tests	Culture on fungal media. Biopsy. Nucleic acid amplification.
Typical Adult Therapy	Surgical excision. There are anecdotal reports of successful therapy with Amphotericin B , Ketoconazole and Itraconazole (latter 200 mg/day X 2 months) or voriconazole
Typical Pediatric Therapy	As for adult (Itraconazole 2 mg/kg/day X 2 months)
Clinical Hints	May follow immune suppression or skin trauma Dermal papules, plaques, eczematoid or ulcerated lesions Olecranon bursitis is common Systemic infection reported in some cases
Synonyms	Chlorellosis, Prototheca, Protothecosis. ICD9: 136.8 ICD10: B99

Pseudocowpox

Agent	VIRUS - DNA. Poxviridae, Parapoxvirus: Pseudocowpox virus
Reservoir	Cattle
Vector	None
Vehicle	Contact
Incubation Period	5d - 14d
Diagnostic Tests	Viral culture (skin lesion or exudate). Serology. Nucleic acid amplification. Biosafety level 3.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Umbilicated nodule on the hand following contact with cattle Mild regional lymphadenopathy.
Synonyms	Bovine papular stomatitis, Farmyard pox, Milker's nodule, Noduli mulgentinum, Paravaccinia, Sealpox. ICD9: 051.1 ICD10: B08.0

Pyoderma (impetigo, abscess, etc)

Agent	BACTERIUM. Various (<i>Staphylococcus aureus</i> & <i>Streptococcus pyogenes</i> predominate)
Reservoir	Human
Vector	None
Vehicle	Endogenous, Secretions, Contact, Trauma
Incubation Period	Variable
Diagnostic Tests	Clinical diagnosis usually sufficient. Aspiration of lesion for smear and culture may be helpful in some cases.
Typical Adult Therapy	Antibiotic directed at likely pathogens (Group A Streptococcus and Staphylococcus aureus)
Typical Pediatric Therapy	As for adult
Clinical Hints	Impetigo characterized by vesicles which progress to pustules ("honey-colored pus") Highly contagious May be complicated by acute glomerulonephritis
Synonyms	Acne vulgaris, Carbonchio, Carbuncle, Folicolite, Follicolite, Folliculite, Folliculitis, Follikulitis, Foroncolosi, Foronculose, Foruncolosi, Furunculosis, Furunkulose, Furunulose, Hydradenitis, Impetigine, Impetigo, Paronychia, Pyoderma. ICD9: 680,684,686 ICD10: L01,L02,L08.0,L73.2

Pyomyositis

Agent	BACTERIUM. Usually <i>Staphylococcus aureus</i>
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Ultrasonography or CT scan.
Typical Adult Therapy	Antibiotic directed at confirmed or suspected pathogen (usually <i>Staphylococcus aureus</i>); drainage
Typical Pediatric Therapy	As for adult
Clinical Hints	Pain, swelling and "woody" induration of a large muscle (usually lower limb or trunk) Associated with fever and leukocytosis Often follows trauma to the involved region Lymphadenopathy uncommon; leucocytosis in most cases.
Synonyms	Tropical pyomyositis. ICD9: 040.81 ICD10: M60.0

Q-fever

Agent	BACTERIUM. <i>Coxiella burnetii</i> Intracellular organism related to Rickettsiae
Reservoir	Cattle, Sheep, Goat, Bird, Fish, Rodent, Rabbit, Tick, Bandicoot, Marsupial, Dog, Cat
Vector	None
Vehicle	Air, Dust, Secretions, Dairy products, Respiratory or pharyngeal acquisition
Incubation Period	18d - 21d (range 4d - 40d)
Diagnostic Tests	Serology. Culture possible in specialized laboratories. Nucleic acid amplification.
Typical Adult Therapy	Doxycycline 100 mg BID X 2w OR Fluoroquinolone Add Hydroxychloroquine 600 mg per day if endocarditis
Typical Pediatric Therapy	Age < 8 years: Erythromycin 10 mg/kg QID X 2 weeks Age >= 8 years: Doxycycline 100 mg BID X 2 weeks
Vaccine	Q fever vaccine
Clinical Hints	Headache, myalgia, cough and hepatic dysfunction Hepatosplenomegaly, "F.U.O." and endocarditis are encountered Proximity to farming or animals during 2 to 4 weeks preceding illness Most infections resolve in 1 to 2 weeks Reported case-fatality rate is 1.5%
Synonyms	Balkan grippe, Candidatus <i>Coxiella massiliensis</i> , <i>Coxiella burnetii</i> , Febbre australiana, Febre Q, Nine Mile fever, Q-Fieber, Q-koorts, Query fever, Red River fever. ICD9: 083.0 ICD10: A78

Q-fever in Madagascar

The first case of Q-fever in Madagascar was reported in 1951. ¹

Seroprevalence surveys

Years	Study Group	Notes
1951	various	0% of farmers, abattoir workers and cattle (1951) ²

Notable outbreaks

Years	Region	Notes
1964*	Tul'ear	^{3 4}

* indicates publication year (not necessarily year of outbreak)

References

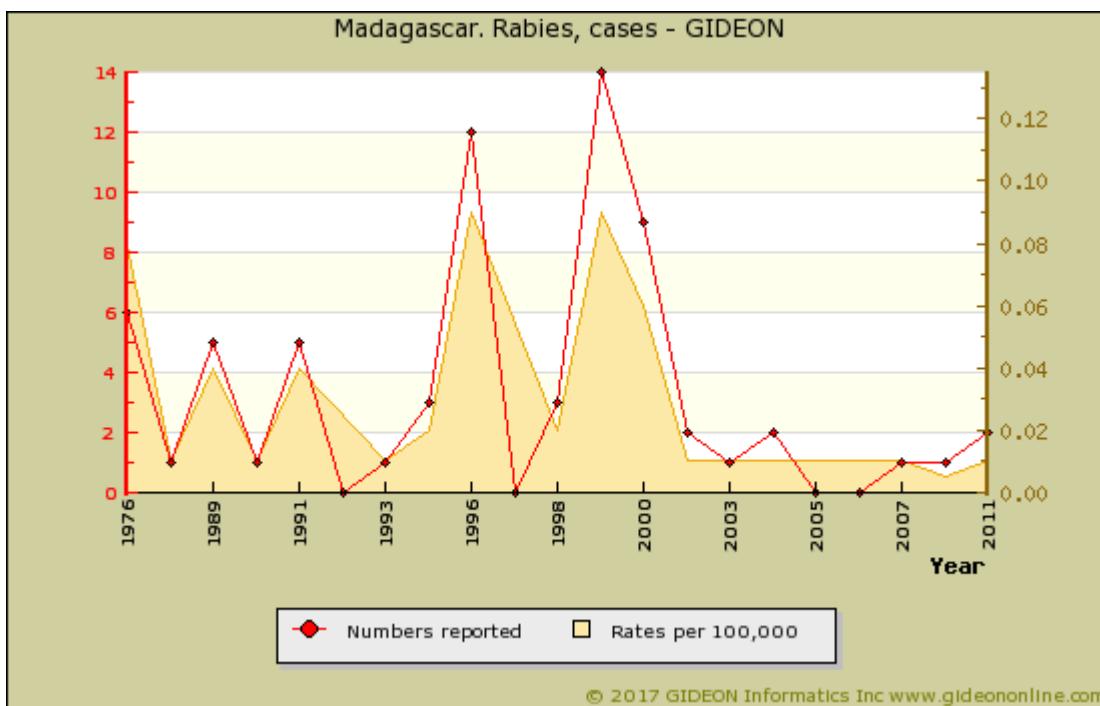
1. [Bull World Health Organ](#) 1955 ;13(5):829-60.
2. [Bull Soc Pathol Exot Filiales](#) 1952 ;45(5):602-4.
3. [Med Trop \(Mars\)](#) 1964 Jan-Feb;24:66-70.
4. [Bull Soc Pathol Exot Filiales](#) 1964 Mar-Apr;57:244-50.

Rabies

Agent	VIRUS - RNA. Rhabdoviridae, Mononegavirales, Lyssavirus: Rabies virus. Other human Lyssaviruses = Mokola, Duvenhage, European Bat (EBL)
Reservoir	Dog, Fox, Skunk, Jackal, Wolf, Cat, Raccoon, Mongoose, Bat, Rodent, Rabbit
Vector	None
Vehicle	Saliva, Bite, Transplants, Air (bat aerosol), Respiratory or pharyngeal acquisition
Incubation Period	1m - 3m (range 4d to 19 years !)
Diagnostic Tests	Viral culture & direct immunofluorescence of saliva, CSF, corneal smears. Serology. Nucleic acid amplification.
Typical Adult Therapy	Strict isolation; supportive. The Milwaukee protocol (prolonged deep sedation and support) has been successful in some cases. See Vaccines module for pre- and post-exposure schedules
Typical Pediatric Therapy	As for adult
Vaccines	Rabies vaccine Rabies immune globulin
Clinical Hints	Follows animal bite (rarely lick) - often after months Agitation, confusion, seizures, painful spasms of respiratory muscles Progressive paralysis, coma and death Case-fatality rate exceeds 99.9%
Synonyms	Aravan, Australian bat lyssavirus, Ballina, BBLV, Bokeloh bat lyssavirus, Duvenhage, EBL, European bat Lyssavirus, Hondsdoelheid, Hydrophobia, Ikoma lyssavirus, Irkut, Khujand, Lyssa, Mokola, Pteropus lyssavirus, Rabia, Rage, Raiva, Saint Hubert's disease, Shimoni bat virus, Tollwut, West Caucasian bat, Wutkrankheit. ICD9: 071 ICD10: A82

Rabies in Madagascar

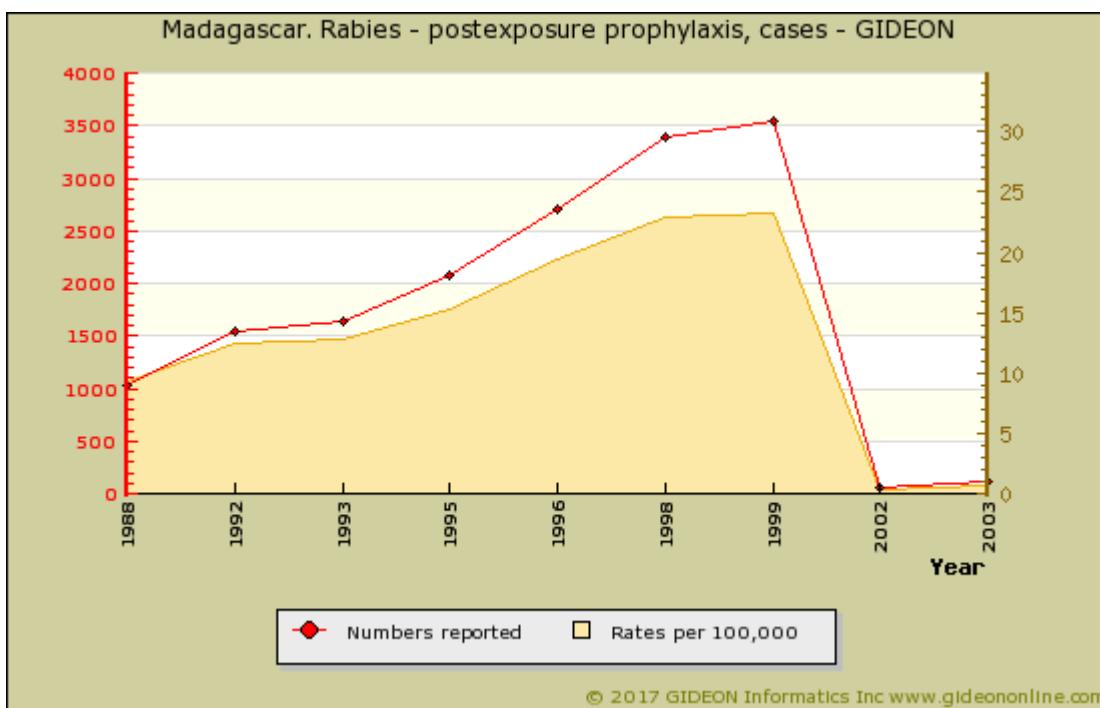
Rabies virus has circulated in Madagascar since at least the 19th century. ¹



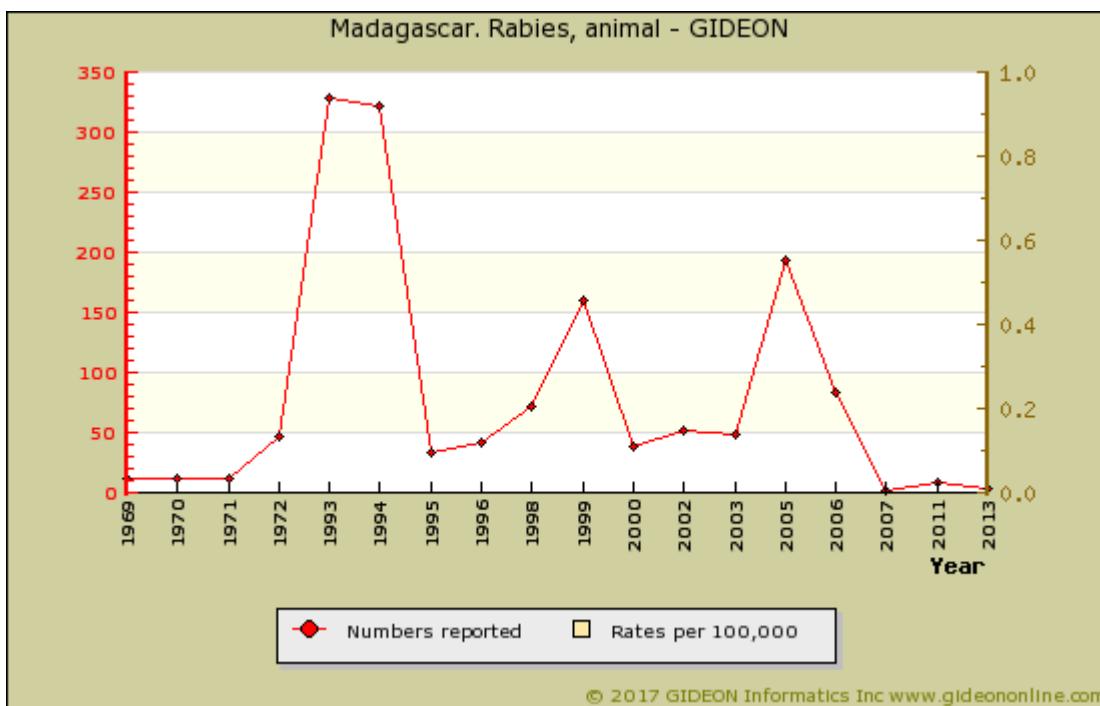
Graph: Madagascar. Rabies, cases

Notes:

- Individual years:
 1993 - From a dog.
 1998 - All from dogs.
 1999 - All from dogs. ²



Graph: Madagascar. Rabies - postexposure prophylaxis, cases



Graph: Madagascar. Rabies, animal

Notes:

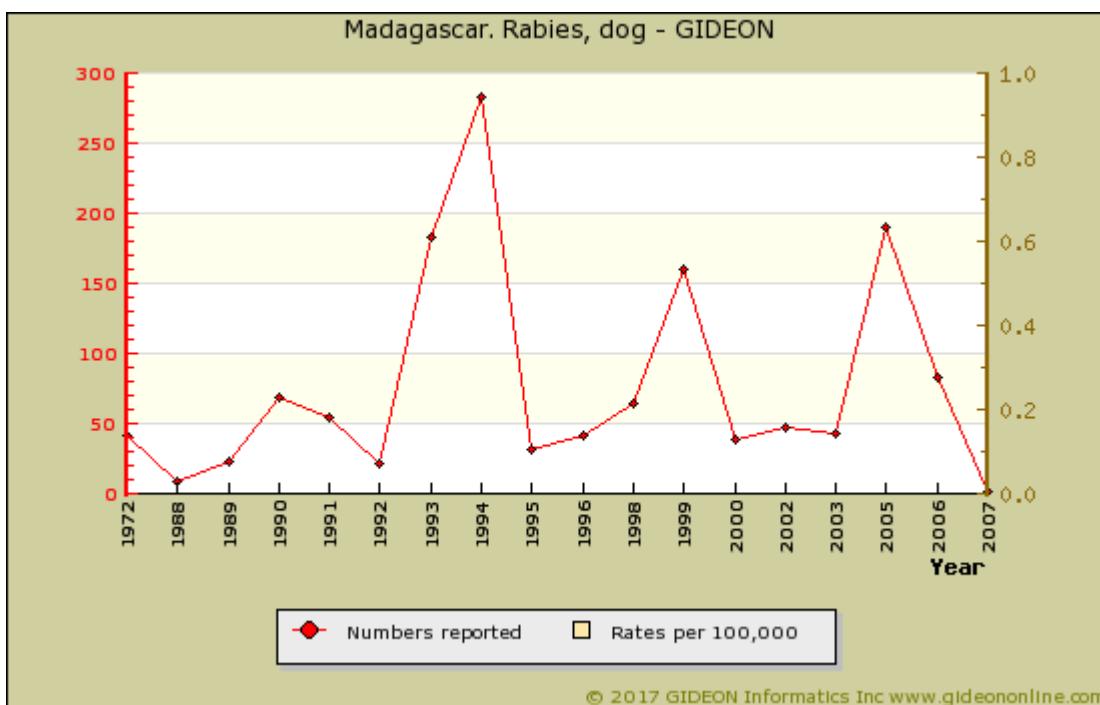
1. No rabid bats were reported during 2003 to 2006.

Individual years:

1996 - Included one cat.

1998 - Included three cats and three ruminants.

1999 - Included three cats and eight ruminants.



Graph: Madagascar. Rabies, dog

Prevalence surveys

Years	Study Group	Notes
2005 - 2010	animals	54% of dogs and 0% of bats (rabies antigen in brain, 2005 to 2010) ³

Seroprevalence surveys

Years	Study Group	%	Notes
2005 - 2010	bats	24	24% of <i>Eidolon dupreanum</i> bats (Lagos bat virus, 2005 to 2010) ⁴

A review of rabies surveillance and control in Reunion, Mayotte and Madagascar - see reference ⁵

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2. [Arch Inst Pasteur Madagascar 1993 ;60\(1-2\):5-8.](#)
3. [Adv Prev Med 2011 ;2011:727821.](#)
4. [Adv Prev Med 2011 ;2011:727821.](#)
5. [Vet Res 2013 ;44:77.](#)

Rat bite fever - spirillary

Agent	BACTERIUM. <i>Spirillum minus</i> An aerobic gram-negative spirochete
Reservoir	Rat, Mouse, Cat
Vector	None
Vehicle	Bite
Incubation Period	7d - 21d (range 5d - 40d)
Diagnostic Tests	Dark-field exam of wound. Animal inoculation.
Typical Adult Therapy	Amoxicillin / Clavulanate 875 / 125 mg PO BID X 7d. OR Procaine Penicillin G 600,000u IM q12h X 7d. OR Doxycycline 200 mg BID X 7d
Typical Pediatric Therapy	Amoxicillin / Clavulanate 10 mg/kg PO BID X 7d OR Procaine Penicillin G 25,000u/kg IM q12h X 7d
Clinical Hints	Lymphadenopathy, myalgia, maculopapular rash and recurrent fever Symptoms begin 1 to 3 weeks after rat bite Infection resolves after 3 to 6 days The case-fatality rate is 6%
Synonyms	Sodoku, Spirillosis, <i>Spirillum minor</i> , <i>Spirillum minus</i> . ICD9: 026.0 ICD10: A25.0

Rat bite fever - streptobacillary

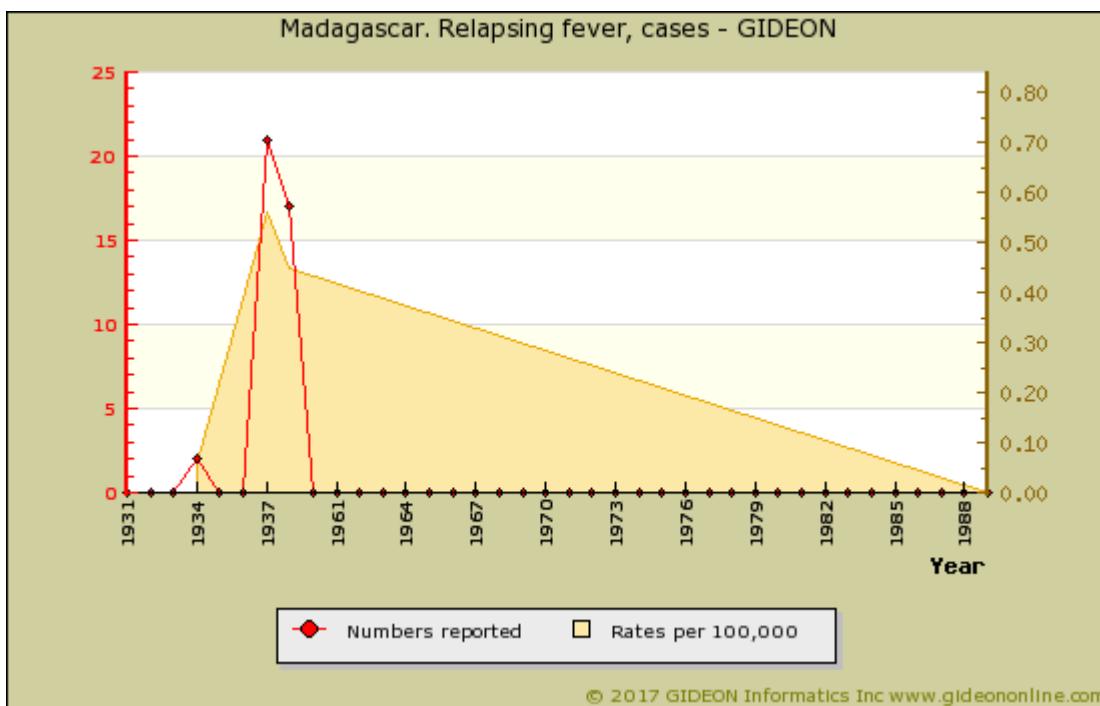
Agent	BACTERIUM. <i>Streptobacillus moniliformis</i> A facultative gram-negative bacillus
Reservoir	Rat, Squirrel, Weasel, Turkey
Vector	None
Vehicle	Secretions, Bite, Dairy products
Incubation Period	3d - 10d (range 1d - 22d)
Diagnostic Tests	Culture of blood or joint fluid. Nucleic acid amplification.
Typical Adult Therapy	Amoxicillin / Clavulanate 875 / 125 mg PO BID X 7d. OR Doxycycline 100 mg PO BID X 7d
Typical Pediatric Therapy	Amoxicillin / Clavulanate 10 mg/kg TID X 7d. OR (if age > 8 years) Doxycycline 2 mg/kg PO BID X 7 days (maximum 200 mg/day)
Clinical Hints	Headache, myalgia, maculopapular rash and arthralgia or arthritis History of a rat bite during the preceding 1 to 3 weeks in most cases Infection has also been acquired from contaminated milk The case-fatality rate is 10%.
Synonyms	Haverhill fever, Streptobacillosis, <i>Streptobacillus moniliformis</i> . ICD9: 026.1 ICD10: A25.1

Relapsing fever

Agent	BACTERIUM. <i>Borrelia</i> spp. A microaerophilic spirochete
Reservoir	Human, Tick, Rodent
Vector	Tick (<i>Ornithodoros</i>), Louse (<i>Pediculus</i>)
Vehicle	Blood, Blood products
Incubation Period	7d - 8d (range 2d - 18d)
Diagnostic Tests	Examination of blood smears (thick and thin smears). Some species (<i>B. hermsii</i>) may grow in BSK II medium.
Typical Adult Therapy	Doxycycline 100 mg PO BID X 7d. OR Erythromycin 500 mg QID X 7d A single dose of Tetracycline 500 mg or erythromycin 500 mg may suffice for louse-borne infection
Typical Pediatric Therapy	Chloramphenicol 12.5 mg/kg PO QID X 7d. OR Erythromycin 10 mg/kg QID X 7d
Clinical Hints	Headache, myalgia, hepatosplenomegaly, rash and relapsing illness Louse-borne (vs. tick borne) infection characterized by higher case-fatality rate, fewer relapses and higher incidence of hepatosplenomegaly, jaundice and neurological complications
Synonyms	Bilious typhoid, <i>Borrelia anserina</i> , <i>Borrelia braziliensis</i> , <i>Borrelia caucasica</i> , <i>Borrelia coriaceae</i> , <i>Borrelia crocidurae</i> , <i>Borrelia dipodilli</i> , <i>Borrelia duttonii</i> , <i>Borrelia graingeri</i> , <i>Borrelia hispanica</i> , <i>Borrelia latyschewii</i> , <i>Borrelia mazzottii</i> , <i>Borrelia merionesi</i> , <i>Borrelia microti</i> , <i>Borrelia miyamotoi</i> , <i>Borrelia parkeri</i> , <i>Borrelia persica</i> , <i>Borrelia queenslandica</i> , <i>Borrelia recurrentis</i> , <i>Borrelia theileri</i> , <i>Borrelia turicatae</i> , <i>Borrelia zbekistana</i> , <i>Borrelia venezuelensis</i> , <i>Borreliosis</i> , <i>Candidatus Borrelia algerica</i> , <i>Candidatus Borrelia kalaharica</i> , Famine fever, Febbre recidiva, Febbre ricorrente, Febris recurrens, Fiebre recurrente, Lauseruckfallfieber, Mianeh fever, Ruckfall fieber, Tilbakefallsfeber, Tilbakefallsfever, Vagabond fever, Yellow famine fever, Yellow plague. ICD9: 087.9,087.0,087.1 ICD10: A68

Although Relapsing fever is not endemic to Madagascar, imported, expatriate or other presentations of the disease have been associated with this country.

Relapsing fever in Madagascar



Graph: Madagascar. Relapsing fever, cases

The local pathogen is *Borrelia duttoni*. ¹

Although no cases have been reported in recent years, the tick vector (*Ornithodoros moubata*) was identified as recently as 1989. ²

References

1. Bull Soc Pathol Exot Filiales 1952 ;45(1):69-78.
2. Bull Soc Pathol Exot Filiales 1989 ;82(2):192-8.

Respiratory syncytial virus infection

Agent	VIRUS - RNA. Paramyxoviridae, Pneumovirinae: Human respiratory syncytial virus
Reservoir	Human
Vector	None
Vehicle	Droplet, Infected secretions (hands), Respiratory or pharyngeal acquisition
Incubation Period	2d - 8d
Diagnostic Tests	Viral culture or DFA (nasal and other respiratory secretions). Serology. Nucleic acid amplification.
Typical Adult Therapy	Ribavirin aerosol 20 mg/ml for 12h/d X 3 to 5d (severe infections). Effectiveness not proven
Typical Pediatric Therapy	As for adult
Vaccine	RSV immune globulin
Clinical Hints	Rhinorrhea, cough, wheezing, bronchiolitis and respiratory distress Most cases occur during infancy
Synonyms	Chimpanzee coryza agent, Respiratory syncytial virus, RSV. ICD9: 079.6,480.1 ICD10: B97.4,J12.1

Respiratory syncytial virus infection in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
1983	Antananarivo	children	18	18% of Malagasy children ages 6 days to 10 years, hospitalized with viral acute respiratory infection (Antananarivo, 1983) ¹
2012*	Southeast Region	children	11.8	11.8% of children ages 2 to 59 months with acute respiratory infection (southeastern Madagascar, 2012 publication) ²
2008 - 2009	Antananarivo	patients	21.2	21.2% of patients with influenza-like illness (Antananarivo, 2008 to 2009) ³

* indicates publication year (not necessarily year of survey)

References

1. Arch Inst Pasteur Madagascar 1986 ;52(1):147-55.
2. PLoS One 2012 ;7(8):e43666.
3. PLoS One 2011 Mar 03;6(3):e17579.

Respiratory viruses - miscellaneous

Agent	VIRUS - RNA and DNA Paramyxoviridae: Mononegavirales Human Metapneumovirus Coronaviridae: New Haven Coronavirus, HKU1 Parvovirinae: Human Bocavirus
Reservoir	Human
Vector	None
Vehicle	Droplet, Secretions (on hands), Respiratory or pharyngeal acquisition
Incubation Period	Unknown
Diagnostic Tests	Viral culture. Serology. Nucleic acid amplification.
Typical Adult Therapy	NA
Typical Pediatric Therapy	NA
Clinical Hints	Rhinorrhea, cough, wheezing, bronchiolitis and respiratory distress Age distribution and prominence of specific signs / symptoms vary somewhat among the specific viruses in this category
Synonyms	Acanthamoeba polyphaga mimivirus, Bat reovirus, Bocavirus, Bradford coccus, Cardiovirus, Coronavirus HKU1, Coronavirus NL63, Encephalomyocarditis Virus, HCoV-HKU1, HCoV-NL63, HK23629/07, HKU1, HRV-A, HRV-B, HRV-C, Human Bocavirus, Human Coronavirus NL63, Human CoV 229E, Human CoV OC43, Human metapneumovirus, Human rhinovirus, Kampar, Karolinska Institutet virus, KI virus, Melaka, Metapneumovirus, Mimivirus, New Haven coronavirus, Pulau, Rhinovirus, Small Anellovirus, Tioman virus, Torque tenovirus, Torquethenovirus, Washington University virus, WU polyomavirus, WU virus. ICD9: 079.89 ICD10: B34.2,J12.8

Respiratory viruses - miscellaneous in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
2012*	Southeast Region	children	11.8-20.5	Rhinovirus was identified in 20.5% of children ages 2 to 59 months with acute respiratory infection, Human metapneumovirus (HMPV) 13.8%, Coronavirus 12.5%, Parainfluenza virus 11.8% and RSV 11.8% (southeastern Madagascar, 2012 publication) 1
2008 - 2009	Antananarivo	patients	5.2-31.2	Rhinovirus was identified in 24.8% of patients with influenza-like illness, Influenza virus 31.2%, RSV 21.2%, Adenovirus 6.1%, Coronavirus OC43 6.1% and Parainfluenza virus 5.2% (Antananarivo, 2008 to 2009) 2

* indicates publication year (not necessarily year of survey)

References

1. PLoS One 2012 ;7(8):e43666.
2. PLoS One 2011 Mar 03;6(3):e17579.

Reye's syndrome

Agent	UNKNOWN
Reservoir	Unknown
Vector	None
Vehicle	Unknown
Incubation Period	Unknown
Diagnostic Tests	Clinical diagnosis.
Typical Adult Therapy	Electrolyte & glucose management, ? enemas, ? dialysis
Typical Pediatric Therapy	As for adult
Clinical Hints	Vomiting, lethargy, coma, seizures, hepatomegaly, hypoglycemia and elevated blood ammonia concentration Patients are usually anicteric Follows viral infection; aspirin ingestion is often implicated.
Synonyms	Reye syndrome. ICD9: 331.81 ICD10: G93.7

Rheumatic fever

Agent	BACTERIUM. <i>Streptococcus pyogenes</i> A facultative gram-positive coccus
Reservoir	Human
Vector	None
Vehicle	Droplet
Incubation Period	1w - 5w
Diagnostic Tests	Clinical diagnosis.
Typical Adult Therapy	Supportive; salicylates
Typical Pediatric Therapy	As for adult
Clinical Hints	Migratory arthritis, fever, carditis, chorea, subcutaneous nodules, erythema marginatum and leukocytosis In most cases, illness follows overt pharyngitis after 1 to 5 weeks An attack of rheumatic fever will persist for approximately 3 months.
Synonyms	Febbre reumatica. ICD9: 390,391 ICD10: I00,I01,I02

Rhinoscleroma and ozena

Agent	BACTERIUM. <i>Klebsiella pneumoniae</i> ssp <i>ozaenae</i> and <i>Klebsiella pneumoniae</i> ssp <i>rhinoscleromatis</i> Facultative gram-negative bacilli
Reservoir	Human
Vector	None
Vehicle	Secretions, Contact, Respiratory or pharyngeal acquisition
Incubation Period	Unknown
Diagnostic Tests	Culture. Biopsy. Nucleic acid amplification. Advise laboratory when this diagnosis is suspected.
Typical Adult Therapy	Rhinoscleroma: Streptomycin , often with systemic or topical Rifampin - for 3 to 6 weeks; fluoroquinolones also appear to be effective. Ozena: Ciprofloxacin or Sulfamethoxazole/trimethoprim for 3 months
Typical Pediatric Therapy	As for adult
Clinical Hints	Rhinoscleroma: - Chronic fetid nasal discharge - A crusting mass may develop in the nose - Infection may extend to the larynx, trachea of paranasal sinuses Ozena: - Chronic rhinitis progressing to atrophy of the nasal mucosa - Extension to the larynx and systemic infection have been reported
Synonyms	<i>Klebsiella pneumoniae</i> ssp <i>ozaenae</i> , Ozena, Rhinoscleroma. ICD9: 040.1 ICD10: J31.0

Rhinosporidiosis

Agent	PROTOCTISTA <i>Rhinosporidium seeberi</i> (may in fact be <i>Microcystis</i> , a cyanobacterium)
Reservoir	Water, Soil, Vegetation
Vector	None
Vehicle	Aerosol from soil or water, Respiratory or pharyngeal acquisition
Incubation Period	2w - 6m
Diagnostic Tests	Histology of resected material (organism does not grow in-vitro).
Typical Adult Therapy	Excision Dapsone has been used in cases of disseminated disease, in some cases combined with cycloserine and ketoconazole
Typical Pediatric Therapy	As for adult
Clinical Hints	Friable, painless vascular masses of nose, conjunctivae and larynx Recurrence is common.
Synonyms	Rhinosporidium seeberi. ICD9: 117.0 ICD10: B48.1

Rhodococcus equi infection

Agent	BACTERIUM. <i>Rhodococcus equi</i> An aerobic gram-positive coccobacillus
Reservoir	Farm animal, Farm soil
Vector	None
Vehicle	Inhalation, Contact, Ingestion
Incubation Period	Unknown
Diagnostic Tests	Culture of blood, body fluids and secretions. Advise laboratory when these organisms are suspected.
Typical Adult Therapy	Two drugs from the following, administered for two months: Levofloxacin , Rifampin , Azithromycin , Ciprofloxacin , Imipenem , Vancomycin
Typical Pediatric Therapy	Two drugs from the following, administered for two months: Levofloxacin , Rifampin , Azithromycin , Imipenem , Vancomycin
Clinical Hints	Most often presents as pleuropulmonary infection in an immune-suppressed patient 40% of patients recall recent contact with farm or farm animals
Synonyms	Rhodococcus. ICD9: 027.9 ICD10: A92.8

Rift Valley fever

Agent	VIRUS - RNA. Bunyaviridae, Phlebovirus: Rift Valley fever virus
Reservoir	Sheep, Ruminant
Vector	Mosquito (<i>Culex, Aedes, Anopheles, Eretmapodites, Mansonia, Culicoides, Coquillettidia</i> spp.)
Vehicle	Respiratory or pharyngeal acquisition
Incubation Period	3d - 5d (range 2d - 7d)
Diagnostic Tests	Viral culture (blood, CSF). Serology. Nucleic acid amplification. Biosafety level 3.
Typical Adult Therapy	Supportive. Animal studies suggest a possible role for Ribavirin .
Typical Pediatric Therapy	As for adult
Vaccine	Rift Valley fever vaccine
Clinical Hints	Headache, myalgia, photophobia, arthralgia and a maculopapular rash Jaundice, hemorrhagic fever or retinitis with blindness in some cases History of contact with sheep or cattle during the preceding week may be elicited The case fatality rate is below 1%
Synonyms	Arumowot, Enzootic hepatitis, Gabek Forest, Gordil, Riftvalleykoorts, Zinga. ICD9: 066.3 ICD10: A92.4

Rift Valley fever in Madagascar

Rift Valley fever (RVF) was first detected in Madagascar in 1979. ¹

Seroprevalence surveys

Years	Region	Study Group	%	Notes
1995	Antananarivo	abattoir workers	9.5	9.5% of abattoir workers (Antananarivo, 1995)
2010 - 2012	multiple locations	animal contact	7.1-12.9	12.9% of cattle herders and 7.1% of controls (Madagascar and Kenya, 2010 to 2012) ²
2008		animals	24.7-25.8	25.8% of cattle, and 24.7% of sheep and goats (2008) ³
2009		bovines	28	28% of bovines (2009) ⁴
2009		pregnant women	0.4-1	0.4% and 1% of pregnant women in two eastern coastal towns, following an outbreak of fever and joint pain (2009) ⁵
2008 - 2010	multiple locations	small mammals	0	0% of small mammals (Afrosoricida and Rodentia, 2008 to 2010) ⁶
1991		various	5.4-29.6	5.4% of humans and 29.6% of cattle in the region of an outbreak (1991) ⁷

Zinga, a variant of RVF virus, was confirmed in mosquitoes in Madagascar in 1980. ^{8 9 10 11}

Twenty-four mosquito species have been identified as potential vectors for Rift Valley fever in Madagascar. ¹²

Notable outbreaks

Years	Region	Cases	Deaths	Notes
1990	Fenerive			13

Years	Region	Cases	Deaths	Notes
1991	Central Highlands			14 15 16
2008 - 2009	Fianarantsoa			RVF virus was isolated from local mosquitoes (<i>Anopheles squamosus</i> , <i>An coustani</i> and <i>Culex antennatus</i>) at the time. 17 18 19 20 21 22 23 24
2008	multiple locations	520	20	Outbreak in Alaotra Mangoro, Analamanga, Itasy, Vakinakaratra and Anosy Regions 25 26 27 28 29 30 31

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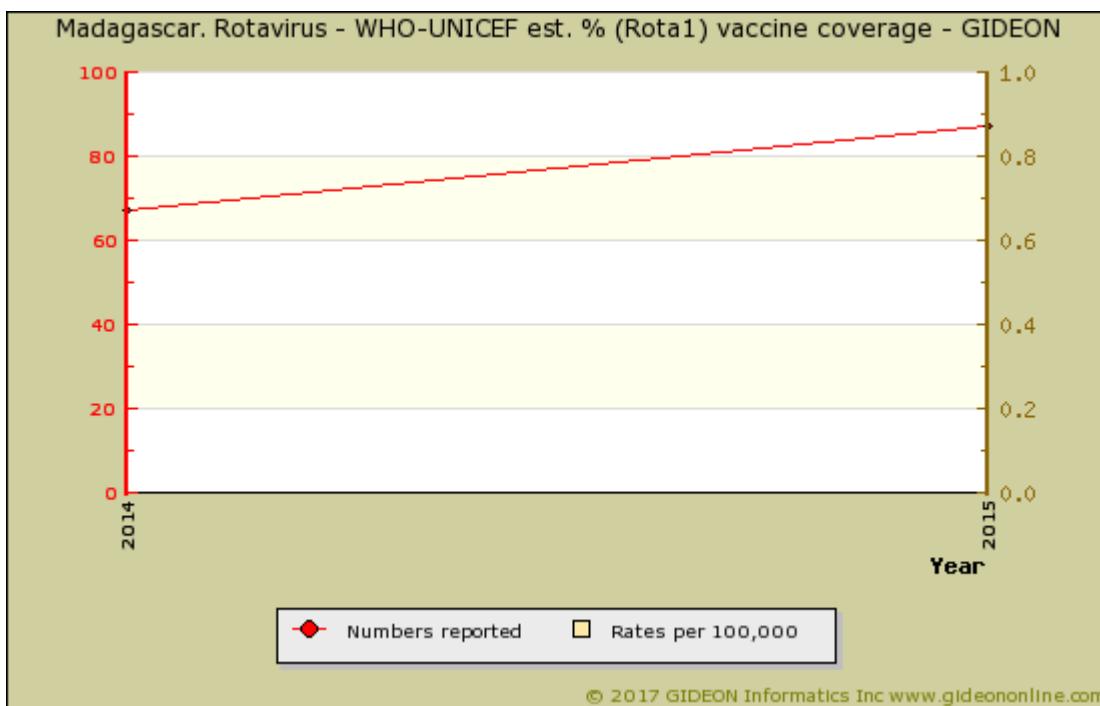
Rotavirus infection

Agent	VIRUS - RNA. Reoviridae: Rotavirus
Reservoir	Human, Pig
Vector	None
Vehicle	Fecal-oral, Water
Incubation Period	2.0 d (range 12h - 3d)
Diagnostic Tests	Stool assay for viral antigen. Serology. Nucleic acid amplification.
Typical Adult Therapy	Stool precautions; supportive
Typical Pediatric Therapy	As for adult
Vaccine	Rotavirus vaccine
Clinical Hints	Vomiting, diarrhea and mild fever The illness lasts approximately 1 week, and is most severe in infancy Fatal cases are associated with dehydration and electrolyte imbalance
Synonyms	Rotavirus. ICD9: 008.61 ICD10: A08.0

Rotavirus infection in Madagascar

Vaccine Schedule:

BCG - birth
DTwPHibHepB - 6,10,14 weeks
IPV - 14 weeks
Measles - 9 months
OPV - birth; 6,10,14 weeks
Pneumo conj - 6,10,14 weeks
Rotavirus - 6,10 weeks
TT - 1st contact pregnancy; +1, +6 months; +1, +1 year



Graph: Madagascar. Rotavirus - WHO-UNICEF est. % (Rota1) vaccine coverage

Prevalence surveys

Years	Region	Study Group	%	Notes
1986 *	Majunga	children	36	36% of children with acute diarrhea (Majunga region, 1986 publication) ¹
1988 - 1990	Tananarive	children	11	11% of children with diarrhea (Tananarive, 1988 to 1990) ²
1988 - 1989		children	10	10% of children ages 0 to 14 years with diarrhea (1988 to 1989) ³
2004 - 2005	Antananarivo	children	36	36% of children below age 16 years with acute gastroenteritis (Antananarivo, 2004 to 2005) ⁴
2008 - 2009		children	6.2	6.2% of children ages <=5 years with diarrhea (2008 to 2009) ⁵
2011 - 2014	Moramanga	children	42.4	42.4% of severe diarrhea in children ages <5 years (Moramanga and Antananarivo, 2011 to 2014) ⁶
2012*		children	6.7	6.7% of children with acute diarrhea (14 districts, 2012 publication) ⁷

* indicates publication year (not necessarily year of survey)

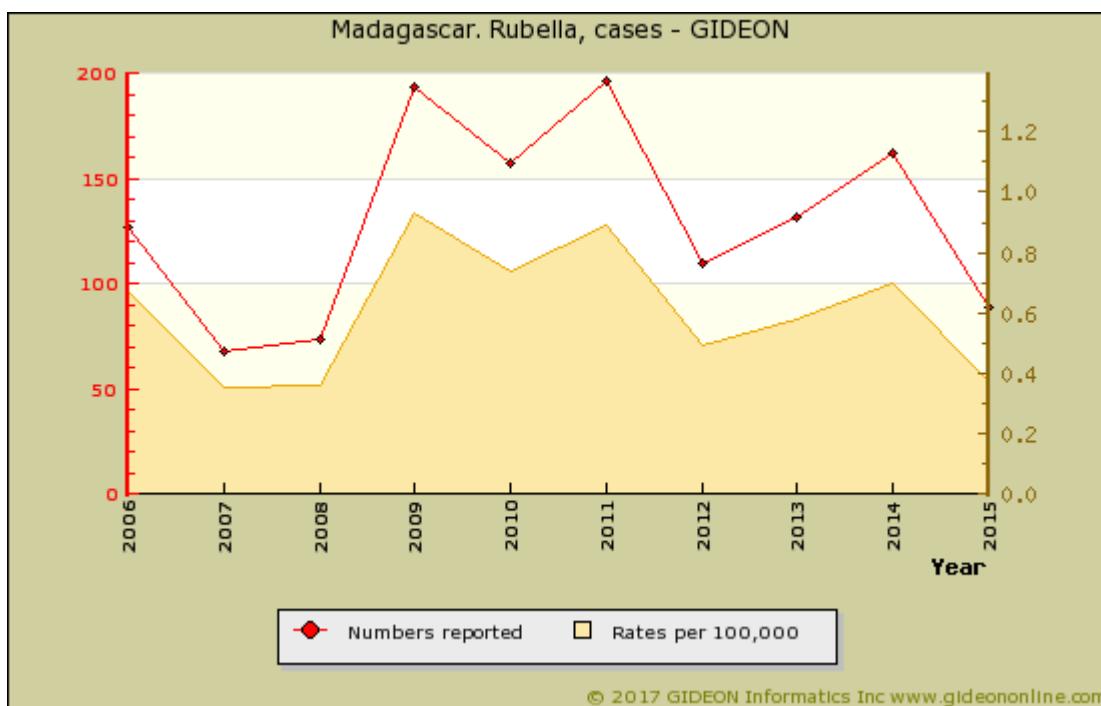
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4. J Infect Dis 2010 Sep 1;202 Suppl:S175-9.
5. J Med Virol 2013 Sep ;85(9):1652-60.
6. PLoS One 2016 ;11(7):e0158862.
7. PLoS One 2012 ;7(9):e44533.

Rubella

Agent	VIRUS - RNA. Togaviridae: Rubivirus, Rubella virus
Reservoir	Human
Vector	None
Vehicle	Contact, Air, Transplacental, Breastfeeding, Respiratory or pharyngeal acquisition
Incubation Period	16d - 18d (range 14d - 23d)
Diagnostic Tests	Viral culture (throat, urine). Serology. Nucleic acid amplification.
Typical Adult Therapy	Respiratory precautions. Supportive
Typical Pediatric Therapy	As for adult
Vaccines	Rubella vaccine Rubella - Mumps vaccine Measles-Mumps-Rubella vaccine Measles-Rubella vaccine
Clinical Hints	Maculopapular rash following a one-day prodrome of coryza and headache Post auricular lymphadenopathy Arthralgia and arthritis are encountered in adults Severe thrombocytopenia or encephalitis may follow acute infection Congenital rubella characterized by hearing loss, congenital heart disease, cataracts, mental retardation and other abnormalities
Synonyms	Epidemic roseola, German measles, Roda hund, Rode hond, Rode hunder, Rodehond, Rosolia, Roteln, Rubeola [Spanish], Three-day measles. ICD9: 056 ICD10: B06

Rubella in Madagascar



Graph: Madagascar. Rubella, cases

Seroprevalence surveys

Years	Study Group	%	Notes
1996*	pregnant women	80.5	80.5% of pregnant women (1996 publication) ¹

* indicates publication year (not necessarily year of survey)

No cases of CRS were reported in 2010.

References

1. Arch Inst Pasteur Madagascar 1996 ;63(1-2):53-5.

Salmonellosis

Agent	BACTERIUM. <i>Salmonella</i> A facultative gram-negative bacillus
Reservoir	Mammal, Bird, Reptile
Vector	None
Vehicle	Food, Milk, Eggs, Poultry Shellfish, Meat, Vegetables, Fruit, Fecal-oral Breastfeeding, Fly
Incubation Period	12h - 36h (range 6h - 5d)
Diagnostic Tests	Culture (stool, blood, infected tissue). Serology.
Typical Adult Therapy	Stool precautions. Therapy not indicated for uncomplicated diarrhea; if necessary, treat per antibiogram
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, chills and watery diarrhea 12 to 24 hours after ingestion of eggs, meat, poultry Fecal leucocytes present Fever resolves in 2 days; but diarrhea may persist for up to 7 days (occasionally weeks)
Synonyms	Salmonellosen, Salmonellosi. ICD9: 003 ICD10: A02

Salmonellosis in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
2015*	Antananarivo	pork	5	5% of ready-to-eat street-vended pork dishes ¹
2015*	Antananarivo	pork	10	Street restaurants pork dishes ²

* indicates publication year (not necessarily year of survey)

References

1. Foodborne Pathog Dis 2015 Mar ;12(3):197-202.
2. Foodborne Pathog Dis 2015 Mar ;12(3):197-202.

Sarcocystosis

Agent	PARASITE - Protozoa. Coccidea, Eimerida: <i>Sarcocystis bovihominis</i> or <i>S. suisomini</i> s
Reservoir	Cattle, Pig
Vector	None
Vehicle	Meat, Water
Incubation Period	9d - 39d
Diagnostic Tests	Identification of cysts in stool.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Diarrhea and abdominal pain of varying severity Muscle pain and eosinophilia occasionally encountered
Synonyms	Isospora hominis, Kudoa, Sarcocystiasis, Sarcocystis, Sarcosporidiosis. ICD9: 136.5 ICD10: A07.8

Scabies

Agent	PARASITE - Arthropod. Arachnid, Acarina (Mite), Sarcoptae: <i>Sarcoptes (Acarus) scabiei</i>
Reservoir	Human
Vector	Mite
Vehicle	Contact, Sexual contact
Incubation Period	3d - 42d
Diagnostic Tests	Identification of mites in skin scrapings.
Typical Adult Therapy	Permethrin 5%. OR Lindane. OR Crotamiton 10% OR Ivermectin 150 to 200 ug/kg PO as single dose
Typical Pediatric Therapy	Permethrin 5%. OR Lindane. OR Crotamiton 10% OR Ivermectin 200 mcg/kg PO (> 15 kg body weight)
Clinical Hints	Intensely pruritic papules, vesicles and burrows Lesions prominent at interdigital webs, wrists, elbows, axillae, perineal region, buttocks and penis Pruritus is most intense at night Severe psoriaform infestation (Norwegian scabies) may affect debilitated patients
Synonyms	Cheyletiella, Cheyletiella infestation, Escabiose, Escabiosis, Histostomatid mites, Kratze, Mange, Ornithonyssus, Pyemotes, Sarcoptes scabiei, Sarna, Scabbia, Skabies, Tropical rat mite. ICD9: 133 ICD10: B86

Scarlet fever

Agent	BACTERIUM. <i>Streptococcus pyogenes</i> A facultative gram-positive coccus
Reservoir	Human
Vector	None
Vehicle	Secretions, Food, Respiratory or pharyngeal acquisition
Incubation Period	1d - 4d
Diagnostic Tests	Typical clinical features associated with group A streptococcal pharyngitis.
Typical Adult Therapy	Benzathine Penicillin G 1.2 million units IM as single dose
Typical Pediatric Therapy	Benzathine Penicillin G : Weight <14kg: 300,000 units IM Weight 14 to 28kg: 600,000 units IM Weight >28kg: 1.2 million units IM
Clinical Hints	Overt pharyngitis followed within 24 to 48 hrs by a florid desquamative erythematous rash
Synonyms	Escarlatina, Lanhousha, Scarlattina, Scharlach. ICD9: 034.1 ICD10: A38

Schistosomiasis - haematobium

Agent	PARASITE - Platyhelminthes, Trematoda. Strigeida, Schistosomatidae: <i>Schistosoma haematobium</i>
Reservoir	Snail (<i>Bulinus</i> , <i>Planorbarius</i> , <i>Ferrissia</i>), Baboon or monkey
Vector	None
Vehicle	Water (skin contact)
Incubation Period	2w - 6w
Diagnostic Tests	Identification of ova in urine or stool. Serology. Antigen detection.
Typical Adult Therapy	Praziquantel 20 mg/kg PO BID X 1 day
Typical Pediatric Therapy	As for adult
Clinical Hints	Early urticaria, fever and eosinophilia Chronic disease associated with dysuria, hematuria and obstructive nephropathy May evolve to bladder cancer in advanced cases Parasite survives for decades in human host
Synonyms	Bilharziasis, urinary, Egyptian hematuria, Katayama fever [1], <i>Schistosoma guineensis</i> , <i>Schistosoma haematobium</i> , Schistosomal hematuria, Schistosomiasis, Vesicle bilharziasis. ICD9: 120.0 ICD10: B65.0

Schistosomiasis - haematobium in Madagascar

Schistosoma haematobium infestation is prevalent from the northeast to south-to-middle west.

Prevalence is estimated at 500,000 (1999 publication). ¹

Prevalence surveys

Years	Region	Study Group	%	Notes
2015		children	30.5	30.5% of children in sentinel sites (2015) ²
1996*	Western Region	general population	76	76% in the rural western region (1996 publication) ³
1998*	Middle-Western Region	general population	76	76% in the middle-western region (1998 publication) ⁴
2015*		general population	35	35% of in an endemic region (genital lesions, 2015 publication) ⁵

* indicates publication year (not necessarily year of survey)

Schistosoma mansoni is the predominant *Schistosoma* species on the eastern half of the island, and *S. haematobium* on the western half.

Notable outbreaks

Years	Cases	Population	Notes
2011	28	tourists	Outbreak among Swiss tourists returning from Madagascar. ⁶

References

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2. Parasit Vectors 2016 Jan 27;9:50.
3. Trans R Soc Trop Med Hyg 1996 Jul-Aug;90(4):398-401.
4. Nephrologie 1998 ;19(6):341-5.
5. J Infect Dis 2015 Jul 15;212(2):275-84.
6. J Travel Med 2015 May-Jun;22(3):168-73.

Schistosomiasis - mansoni

Agent	PARASITE - Platyhelminthes, Trematoda. Strigeida, Schistosomatidae: <i>Schistosoma mansoni</i>
Reservoir	Snail (<i>Biomphalaria</i>), Dog, Cat, Pig, Cattle, Rodent, Horse, Non-human primate
Vector	None
Vehicle	Water (skin contact)
Incubation Period	2w - 6w
Diagnostic Tests	Identification of ova in stool or biopsy specimens. Serology. Antigen detection.
Typical Adult Therapy	Praziquantel 20 mg/kg PO BID X one day OR Oxamniquine 15 mg PO X one dose
Typical Pediatric Therapy	Praziquantel 20 mg/kg PO BID X one day OR Oxamniquine 10 mg PO BID X one day
Clinical Hints	Early urticaria, fever and eosinophilia Later, hepatosplenomegaly and portal hypertension Parasite may survive for decades in human host
Synonyms	Bilharziasis, intestinal, Katayama fever [3], Schistosoma mansoni. ICD9: 120.1 ICD10: B65.1

Schistosomiasis - mansoni in Madagascar

Time and Place:

Schistosoma mansoni infestation is prevalent in the central highlands, east and south.

- Disease prevalence is estimated at 2 million cases (1999 publication). ¹

Schistosoma mansoni is the predominant *Schistosoma* species on the eastern half of the island, and *S. haematobium* on the western half.

Prevalence surveys

Years	Region	Study Group	%	Notes
2014*		children	77.1	77.1% of children ages 4 to 18 years in a highland village (PCR, 2014 publication) ²
2015		children	5	5.0% of children in sentinel sites (2015) ³
1981 *	Eastern Region	general population	59.9	59.9% in rural eastern Madagascar (1981 publication) ⁴
1994	Tetikanana	general population	68.3	68.3% of the population of Tetikanana (1994)
1996 - 1997	Mahajanga	patients	3.7	3.7% of hospital patients in the Mahajanga region (1996 to 1997) ⁵

* indicates publication year (not necessarily year of survey)

Seroprevalence surveys

Years	Region	Study Group	%	Notes
2005 - 2008	Antananarivo	patients	21.6	21.6% of patients with hepatosplenomegaly (Antananarivo, 2005 to 2008) ⁶

The local reservoir is *Biomphalaria pfeifferi*. ⁷

Notable outbreaks

Years	Cases	Population	Notes
2011	28	tourists	Outbreak among Swiss tourists returning from Madagascar. <i>Schistosoma</i> species not specified. ⁸

References

-
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 5. Bull Soc Pathol Exot 2003 Mar ;96(1):41-5.
 6. Sante 2010 Jan-Mar;20(1):15-9.
 7. Mol Ecol 2002 Nov ;11(11):2213-28.
 8. J Travel Med 2015 May-Jun;22(3):168-73.

Septic arthritis

Agent	BACTERIUM or FUNGUS. Gram positive cocci most common; gram negative bacilli, gonococci, mycobacteria , fungi, et al
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Smear and culture of joint fluid. Cytological and chemical analysis of joint fluid also useful.
Typical Adult Therapy	Antimicrobial agent(s) directed at known or likely pathogen
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever (60% to 80%) associated with swelling, erythema and tenderness Usually involves a single joint, most commonly knee; elbow or ankle in child Mean fluid leukocyte count in acute bacterial forms is 50,000 per cu mm
Synonyms	

Septicemia - bacterial

Agent	BACTERIUM. <i>Escherichia coli</i> , <i>Staphylococcus aureus</i> , facultative gram negative bacilli, et al
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Culture of blood and sepsis source.
Typical Adult Therapy	Antimicrobial agent(s) directed at known or likely pathogen
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, rigors, leukocytosis, tachypnea, mental changes Hypotension, acidosis and bleeding diathesis herald septic shock Additional signs (eg, urinary infection, phlebitis, etc) may point to the source of infection
Synonyms	Sepsis, Septicaemia, Septicemia, Septicemie, Septikemie, Setticemia. ICD9: 036.2,036.3,038 ICD10: A40,A41

Shigellosis

Agent	BACTERIUM. <i>Shigella sonnei</i> , <i>Shigella flexneri</i> , <i>Shigella boydii</i> or <i>Shigella dysenteriae</i> A facultative gram-negative bacillus
Reservoir	Human, Non-human primate
Vector	None
Vehicle	Fecal-oral, Water, Dairy products, Fomite, Fly, Vegetables
Incubation Period	48h - 72h (range 7h - 1w)
Diagnostic Tests	Stool culture.
Typical Adult Therapy	Stool precautions. Choice of antimicrobial agent based on regional susceptibility patterns. Continue treatment for five days
Typical Pediatric Therapy	As for adult
Clinical Hints	Watery or bloody diarrhea, tenesmus, abdominal pain and headache Colonic hyperemia and abundant fecal leucocytes are present Usually resolves in 3 days, but may persist for up to 14 Reported case fatality rate is 1% - severity and mortality highest with <i>Shigella dysenteriae</i> infection
Synonyms	Bacillaire dysenterie, Bacillary dysentery, Dissenteria batterica, Dysenteria bacillaris, Leptospirenerkrankung, Ruhr, Shigella, Shigellose, Shigelose, Übertragbare Ruhr. ICD9: 004 ICD10: A03

Shigellosis in Madagascar

Shigellae were the most common agents of dysentery or diarrhea in Tananarive (1979 publication). ¹

References

1. Med Trop (Mars) 1979 Jul-Aug;39(4):453-6.

Sindbis

Agent	VIRUS - RNA. Togaviridae, Alphavirus: Sindbis virus
Reservoir	Wild bird
Vector	Mosquito (<i>Culex univittatus</i> and <i>Cx. tritaeniorhyncus</i>)
Vehicle	None
Incubation Period	3d - 6d
Diagnostic Tests	Viral culture (blood, vesicle fluid). Serology. Nucleic acid amplification. Biosafety level 2.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, myalgia, arthritis and a papular-to-vesicular rash Arthralgias may persist for more than three years Fatality not reported.
Synonyms	Babanki, Whataroa. ICD9: 078.89 ICD10: A92.8

Although Sindbis is not endemic to Madagascar, imported, expatriate or other presentations of the disease have been associated with this country.

Sindbis in Madagascar

Human infection by a related agent, Babanki virus, has been reported in Madagascar.

Babanki virus has been found in local rodents - *Suncus murinus*, *Rattus norvegicus* and *Rattus rattus*.

- The following mosquito vectors for Babanki virus have been identified in Madagascar: *Aedes (Stegomyia) aegypti*, *Culex (Culex) decens*, *Culex (Culex) Melange* species. [1](#) [2](#) [3](#) [4](#)

References

- | | |
|---|--|
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| 2. Arch Inst Pasteur Madagascar 1989 ;56(1):287-95. | 4. Arch Inst Pasteur Madagascar 1989 ;55(1):1-317. |

Sinusitis

Agent	BACTERIUM. Various (<i>Haemophilus influenzae</i> & <i>Streptococcus pneumoniae</i> in most acute cases)
Reservoir	Human
Vector	None
Vehicle	None
Incubation Period	Variable
Diagnostic Tests	Imaging techniques. Culture of sinus drainage.
Typical Adult Therapy	Amoxicillin / Clavulanate 2000 / 125 mg BID X 7 days Drainage as indicated Alternatives: Levofloxacin , Cllindamycin, Cefuroxime , Cefdinir
Typical Pediatric Therapy	Amoxicillin / Clavulanate 90 / 6.4 mg/kg BID X 7 days Drainage as indicated Alternatives: Cllindamycin, Cefuroxime , Cefdinir
Clinical Hints	Sinusitis often follows upper respiration infections Headache, fever and local tenderness are common The precise presentation varies with patient age and anatomic localization
Synonyms	Acute sinusitis, Mastoidite, Mastoiditis, Rhinosinusitis, Sinusite. ICD9: 473.9,383.0,461 ICD10: H70,J01

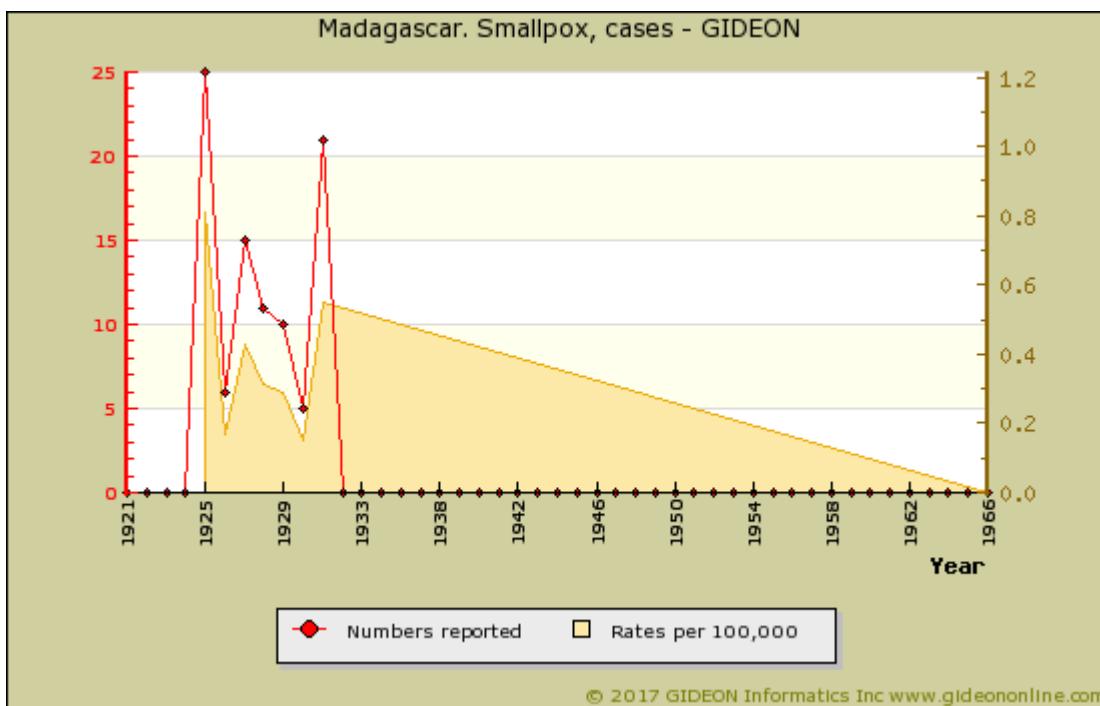
Smallpox

Agent	VIRUS - DNA. Poxviridae, Orthopoxvirus: Variola virus
Reservoir	Human
Vector	None
Vehicle	Contact, Secretions, Fomite, Respiratory or pharyngeal acquisition
Incubation Period	7d - 17d
Diagnostic Tests	Culture and electron microscopy of skin lesions. Serology. Nucleic acid amplification. Biosafety level 3.
Typical Adult Therapy	Isolation Tecovirimat 400 to 600 mg PO once daily X 14 days Cidofovir is effective in vitro
Typical Pediatric Therapy	Isolation Pediatric dosage of Tecovirimat not established
Vaccine	Smallpox vaccine
Clinical Hints	Fever, myalgia, headache with pustular or hemorrhagic rash Disease resolves in 2 to 3 weeks Reported case-fatality rate is 25% for severe form (variola major) and 1% for minor form; The last naturally-acquired case was reported in Somalia in 1977
Synonyms	Alastrim, Eczema vaccinatum, Kopper, Smallpox, Vailo, Variola, Variola minor, Varioloid. ICD9: 050 ICD10: B03

Not currently endemic to any country.

Although Smallpox is not endemic to Madagascar, imported, expatriate or other presentations of the disease have been associated with this country.

Smallpox in Madagascar



Graph: Madagascar. Smallpox, cases

No fatal cases were reported during 1930 to 1933.

Indigenous transmission ended before 1918.

Notable outbreaks

Years	Cases	Deaths	Notes
1901	262	98	Outbreak followed introduced infection from Africa and India was reported.

Sparganosis

Agent	PARASITE - Platyhelminthes, Cestoda. Pseudophyllidea, Diphyllobothriidae: <i>Spirometra</i> spp.
Reservoir	Copepod (to bird, amphibian or reptile)
Vector	None
Vehicle	Water (ingested copepod), Undercooked reptile or amphibian meat, Contact (ie, conjunctiva)
Incubation Period	20d - 3y
Diagnostic Tests	Identification of parasite in tissue.
Typical Adult Therapy	Excision Praziquantel 120 to 150 mg/kg daily X 2 days has been used, but should be combined with excision
Typical Pediatric Therapy	As for adult
Clinical Hints	Painful or pruritic nodules and eosinophilia Worm present in skin, eye, brain or other foci and may survive for over five years
Synonyms	

Sporotrichosis

Agent	FUNGUS. Ascomycota, Euascomycetes, Ophiostomatales: <i>Sporothrix schenckii</i> , <i>S. brasiliensis</i> and <i>S. globosa</i> A dimorphic dematiaceous fungus
Reservoir	Soil, Vegetation, Wood
Vector	None
Vehicle	Trauma, Contact, Air, Respiratory or pharyngeal acquisition
Incubation Period	1w - 3m
Diagnostic Tests	Fungal culture. Serologic tests available in some centers.
Typical Adult Therapy	Itraconazole 100 to 200 mg PO daily X 3 to 6 months. OR Fluconazole 400 mg PO daily X 6 months. OR Potassium iodide 1 to 5 ml PO TID X 3 to 6 months
Typical Pediatric Therapy	Itraconazole 2 mg/kg PO daily X 3 to 6 months. OR Fluconazole 3 mg/kg PO daily X 6 months.
Clinical Hints	Draining nodules which appear along the course of lymphatics Acquired from contact with flowers, thorns, trees or other plant material Eye, brain, testis, bone and other tissues may be involved
Synonyms	Rose gardener's disease, Schenck's disease, Sporothrix brasiliensis, Sporothrix chiensis, Sporothrix globosa, Sporothrix mexicana, Sporothrix schenckii, Sporotrichose. ICD9: 117.1 ICD10: B42

Staphylococcal food poisoning

Agent	BACTERIUM. <i>Staphylococcus aureus</i> exotoxins
Reservoir	Human (nares, hands), Cattle (udder), Dog/Cat (nasopharyngeal)
Vector	None
Vehicle	Food (creams, gravies, sauces)
Incubation Period	2h - 4h (range 30 min - 9h)
Diagnostic Tests	Identification of bacterium in food.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	'Explosive' diarrhea and vomiting Usually no fever No fecal leucocytes Onset 1 to 6 hours after food Resolves within 1 to 2 days Fatality is rarely reported
Synonyms	Staphylococcus aureus food poisoning. ICD9: 005.0 ICD10: A05.0

Staphylococcal scalded skin syndrome

Agent	BACTERIUM. <i>Staphylococcus aureus</i> phage group 2 A facultative gram-positive coccus
Reservoir	Human
Vector	None
Vehicle	Contact, Secretions
Incubation Period	1d - 4d
Diagnostic Tests	Typical clinical features; Recovery of <i>S. aureus</i> from localized wound or blood ; skin biopsy may be helpful
Typical Adult Therapy	Fluid replacement (as for burn) ; Intravenous Nafcillin or Oxacillin , in addition to application of anti-staphylococcal drug to local source infection; Vancomycin if MRSA Clindamycin used to interfere with toxin production.
Typical Pediatric Therapy	Fluid replacement (as for thermal burn) ; Intravenous Nafcillin or Oxacillin , in addition to application of anti-staphylococcal drug to local source infection; Vancomycin if MRSA
Clinical Hints	Acute, generalized exfoliative dermatitis which occurs primarily in infants and young children A pre-existing localized skin infection is present in most cases
Synonyms	Lyell disease, Ritter disease, Ritter von Ritterschein disease, Scalded skin syndrome, SSSS. ICD9: 695.81 ICD10: L00

Streptococcus suis infection

Agent	BACTERIUM. <i>Streptococcus suis</i> I and <i>Streptococcus suis</i> II A facultative gram-positive coccus
Reservoir	Pig
Vector	None
Vehicle	Air, Secretions, Meat, Wound, Contact
Incubation Period	Unknown. Probably hours to few days
Diagnostic Tests	Culture of blood, tissue, body fluids
Typical Adult Therapy	Systemic antibiotic. Usually susceptible in vitro to Penicillin, Amoxicillin, Chloramphenicol and Gentamicin
Typical Pediatric Therapy	Systemic antibiotic
Clinical Hints	Severe multisystem disease, hemorrhagic diatheses, deafness or meningitis Disease appears hours to a few days after contact with pigs or pig products
Synonyms	Streptococcus suis. ICD9: 027.8 ICD10: A48.8

Strongyloidiasis

Agent	PARASITE - Nematoda. Secernentea: <i>Strongyloides stercoralis</i> (<i>Strongyloides fulleborni</i> is occasionally implicated in systemic disease)
Reservoir	Human, Dog, Monkey (for <i>Strongyloides fulleborni</i>)
Vector	None
Vehicle	Skin contact, Soil, Feces, Autoinfection, Sexual contact
Incubation Period	14d - 30d
Diagnostic Tests	Identification of larvae (or ova, for <i>Strongyloides fulleborni</i>) in stool or duodenal aspirate. Serology.
Typical Adult Therapy	Ivermectin 200 micrograms/kg/d PO daily X 2d OR Thiabendazole 25 mg/kg BID (max 3g) X 2d OR Albendazole 400 mg/d X 3d (7 days for hyperinfection syndrome)
Typical Pediatric Therapy	Ivermectin 200 micrograms/kg/d PO daily X 2d OR Thiabendazole 25 mg/kg BID (max 3g) X 2d. OR Albendazole 200 mg/d X 3d (7 days for hyperinfection syndrome)
Clinical Hints	Diarrhea, gluteal or perineal pruritus and rash Eosinophilia often present Widespread dissemination encountered among immune-suppressed patients (case-fatality rate for this complication = 80%)
Synonyms	Anguilluliasis, Anguillulosis, Cochin China gastroenteritis, Diploscapter, Halicephalobus, Larva currens, Leptodera intestinales, Leptodera stercoralis, Lungworm, Metastrongylus, Micronema, Pseudo-rhabdis stercoralis, Rhabditis stercoralis, Rhabdonema intestinale, Rhabdonema stercoralis, <i>Strongyloides fulleborni</i> , <i>Strongyloides stercoralis</i> , Strongyloidose, Threadworm, Turbatrix. ICD9: 127.2 ICD10: B78

Subdural empyema

Agent	BACTERIUM. <i>Haemophilus influenzae</i> , oral anaerobes, streptococci, et al
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Imaging techniques (CT scan, etc).
Typical Adult Therapy	Antimicrobial agent(s) directed at known or likely pathogen
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, severe headache, vomiting, signs of meningeal irritation and increased cerebrospinal fluid pressure May follow head trauma, meningitis, otitis or sinusitis Case-fatality rates vary from 15% (patient alert) to 60% (comatose)
Synonyms	

Suppurative parotitis

Agent	BACTERIUM. Most commonly <i>Staphylococcus aureus</i>
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Unknown
Diagnostic Tests	Clinical features (local swelling and purulent discharge from salivary ducts). Stain and culture of discharge.
Typical Adult Therapy	Surgical drainage and aggressive parenteral antistaphylococcal therapy
Typical Pediatric Therapy	As for adult
Clinical Hints	Consider in patient with unexplained fever in the setting of malnutrition, dehydration and obtundation Local swelling and discharge of pus from salivary duct
Synonyms	Parotitis, bacterial. ICD9: 527.2 ICD10: K11.3

Syphilis

Agent	BACTERIUM. <i>Treponema pallidum</i> subsp. <i>pallidum</i> A microaerophilic gram-negative spirochete
Reservoir	Human
Vector	None
Vehicle	Sexual contact, Secretions, Respiratory or pharyngeal acquisition
Incubation Period	2w - 4w (range 10d - >8w)
Diagnostic Tests	Dark field microscopy (chancre). VDRL confirmed by antitreponemal test (FTA, MHTP). Nucleic acid amplification.
Typical Adult Therapy	Primary, secondary or early (< 1 year) latent: Benzathine Penicillin G 2.4 million units IM Other stages: Repeat dosage at one and two weeks Alternatives: Tetracycline , Ceftriaxone
Typical Pediatric Therapy	Primary, secondary or early (< 1 year) latent: Benzathine Penicillin G : Weight <14 kg: 600,000u IM Weight 14 to 28 kg: 1,200,000u IM Other stages: Repeat dosage at one and two weeks
Clinical Hints	Firm, painless chancre (primary syphilis) Fever, papulosquamous rash and multisystem infection (secondary syphilis) Late necrotic lesions of brain, aorta, bone or other organs (tertiary syphilis)
Synonyms	Canton rash, Chinese ulcer, Christian disease, French disease, German sickness, Harde sjanker, Lues, Neopolitan itch, Polish sickness, Sifilide, Sifilis, Spanish pockes, Syphilis, Treponema pallidum. ICD9: 090,091,092,093,094,095,096,097 ICD10: A50,A51,A52,A53

Syphilis in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
1994*	Antananarivo	patients - STD	46	46% of genital ulcers treated in venereal disease clinics (Antananarivo, 1994 publication) 1
1999*	Antananarivo	patients - STD	29	29% of genital ulcers treated in venereal disease clinics (Antananarivo, 1999 publication) 2

* indicates publication year (not necessarily year of survey)

Seroprevalence surveys

Years	Region	Study Group	%	Notes
2011 - 2012	Blantyre	MSM	5.3	5.3% of MSM (Blantyre, 2011 to 2012) 3
1995	multiple locations	pregnant women	12-30	12% of pregnant women and 30% of nonregistered CSW (Antananarivo, Toamasina and Tulear, 1995)
2010	multiple locations	pregnant women	3	3% of pregnant women in Ambositra, Ifanadiana, Manakara, Mananjary, Moramanga and Tsiroanomandidy (2010) 4
1996*	Antsiranana	sex workers	39	39% of CSW in Antsiranana (1996 publication) 5
1998	Toliary	sex workers	18.4	18.4% of CSW in Toliary (1998) 6
2009*		sex workers	11	11% of CSW (2009 publication) 7

* indicates publication year (not necessarily year of survey)

References

1. [Sex Transm Dis 1994 Nov-Dec;21\(6\):315-20.](#)
2. [J Infect Dis 1999 Oct ;180\(4\):1382-5.](#)
3. [J Int AIDS Soc 2013 Dec 02;16 Suppl 3:18742.](#)
4. [Trop Med Int Health 2013 Jan ;18\(1\):35-9.](#)
5. [Arch Inst Pasteur Madagascar 1996 ;63\(1-2\):8-11.](#)
6. [Trop Med Int Health 2003 Jan ;8\(1\):60-6.](#)
7. [Med Mal Infect 2009 Dec ;39\(12\):909-13.](#)

Taeniasis

Agent	PARASITE - Platyhelminthes, Cestoda. Cyclophyllidae, Taeniidae: <i>Taenia solium</i> & <i>T. saginata</i> (other species occasionally encountered)
Reservoir	Cattle, Pig
Vector	None
Vehicle	Meat
Incubation Period	6w - 14w
Diagnostic Tests	Identification of ova or proglottids in feces.
Typical Adult Therapy	Praziquantel 10 mg/kg PO as single dose OR Niclosamide 2 g PO once
Typical Pediatric Therapy	Praziquantel 10 mg/kg PO as single dose OR Niclosamide 50 mg/kg PO once
Clinical Hints	Vomiting and weight loss Often symptomatic or first recognized due to passage of proglottids Parasite may survive for over 25 years in the human intestine
Synonyms	Bandwurmer [Taenia], Drepanidotaenia, Gordiid worm, Hair snake, Mesocestoides, Raillietina, <i>Taenia asiatica</i> , <i>Taenia longihamatus</i> , <i>Taenia saginata</i> , <i>Taenia saginata asiatica</i> , <i>Taenia solium</i> , <i>Taenia taeniaformis</i> , <i>Taeniarhynchiasis</i> , Tapeworm (pork or beef), Tenia. ICD9: 123.0,123.2 ICD10: B68

Taeniasis in Madagascar

As of 2010, there were over 500,000 pig herds (1,380,000 pigs) in Madagascar.¹

- Most cases of pig infestation are reported from the central Highlands, with Vakinsnkaratra accounting for 48%.

Prevalence surveys

Years	Region	Study Group	%	Notes
1996 - 1997	Mahajanga	patients	0.75	0.75% of hospital patients in the Mahajanga region (1996 to 1997) ²
2015*	Antananarivo	pigs	21.03	21.03% of pigs, estimated (porcine cysticercosis, Antananarivo, 2015 publication) ³
2015*	Antananarivo	pigs	2.3	2.3% of pigs at slaughter (porcine cysticercosis, Antananarivo, 2015 publication) ⁴

* indicates publication year (not necessarily year of survey)

A review of veterinary cysticercosis control in Madagascar (2013 publication) - see reference ⁵

References

1. Trends Parasitol 2013 Nov ;29(11):538-47.
2. Bull Soc Pathol Exot 2003 Mar ;96(1):41-5.
3. Parasit Vectors 2015 ;8:391.
4. Vet Parasitol 2016 Mar 30;219:77-83.
5. Trends Parasitol 2013 Nov ;29(11):538-47.

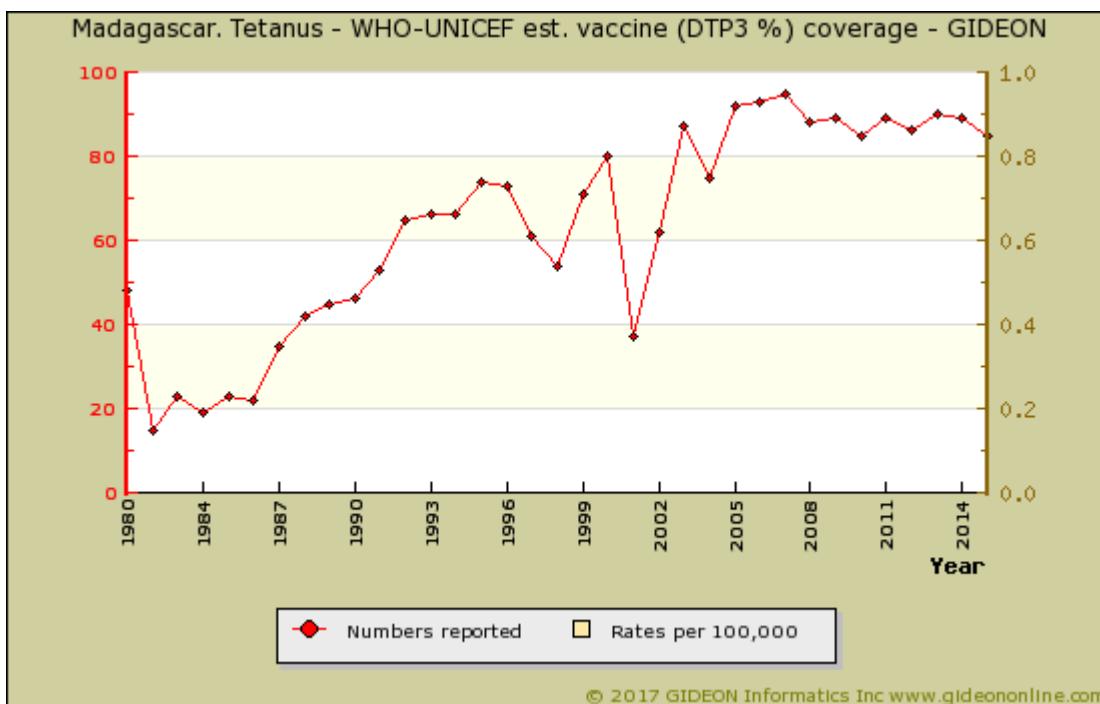
Tetanus

Agent	BACTERIUM. <i>Clostridium tetani</i> An anaerobic gram-positive bacillus
Reservoir	Animal feces, Soil
Vector	None
Vehicle	Trauma
Incubation Period	6d - 8d (range 1d - 90d)
Diagnostic Tests	Isolation of <i>C. tetani</i> from wound is rarely helpful. Serology (specimen taken before administration of antitoxin).
Typical Adult Therapy	Human antitoxin (see Vaccine module). Metronidazole (2 g daily) or Penicillin G (24 million u daily) or Doxycycline (200 mg daily). Diazepam (30 to 240 mg daily). Tracheostomy, hyperalimentation
Typical Pediatric Therapy	Human antitoxin (see Vaccine module). Metronidazole (30 mg/kg daily); or Penicillin G (300,000 units/kilo daily). Diazepam. Tracheostomy, hyperalimentation
Vaccines	DT vaccine DTaP vaccine DTP vaccine Td vaccine Tetanus immune globulin Tetanus vaccine
Clinical Hints	Trismus, facial spasm, opisthotonus, tachycardia and recurrent tonic spasms of skeletal muscle Sensorium is clear Disease may persist for 4 to 6 weeks Case fatality rates of 10% to 40% are reported
Synonyms	Lockjaw, Starrkrampf, Stelkrampf, Tetano, Tetanos. ICD9: 037,771.3 ICD10: A33,A34,A35

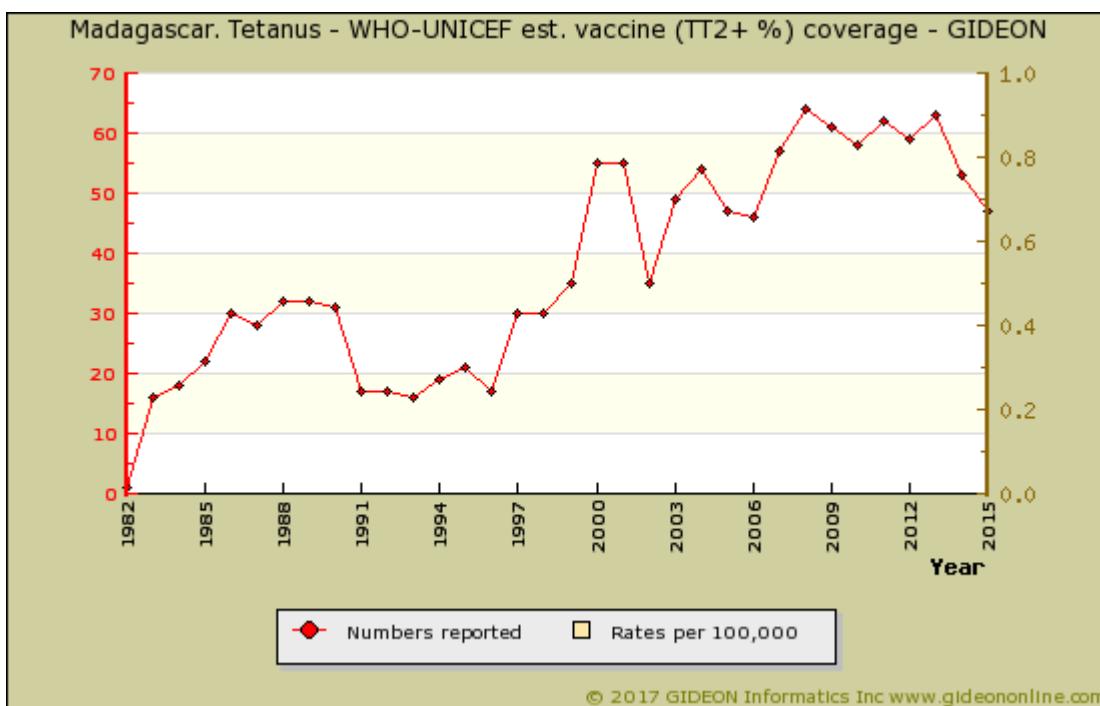
Tetanus in Madagascar

Vaccine Schedule:

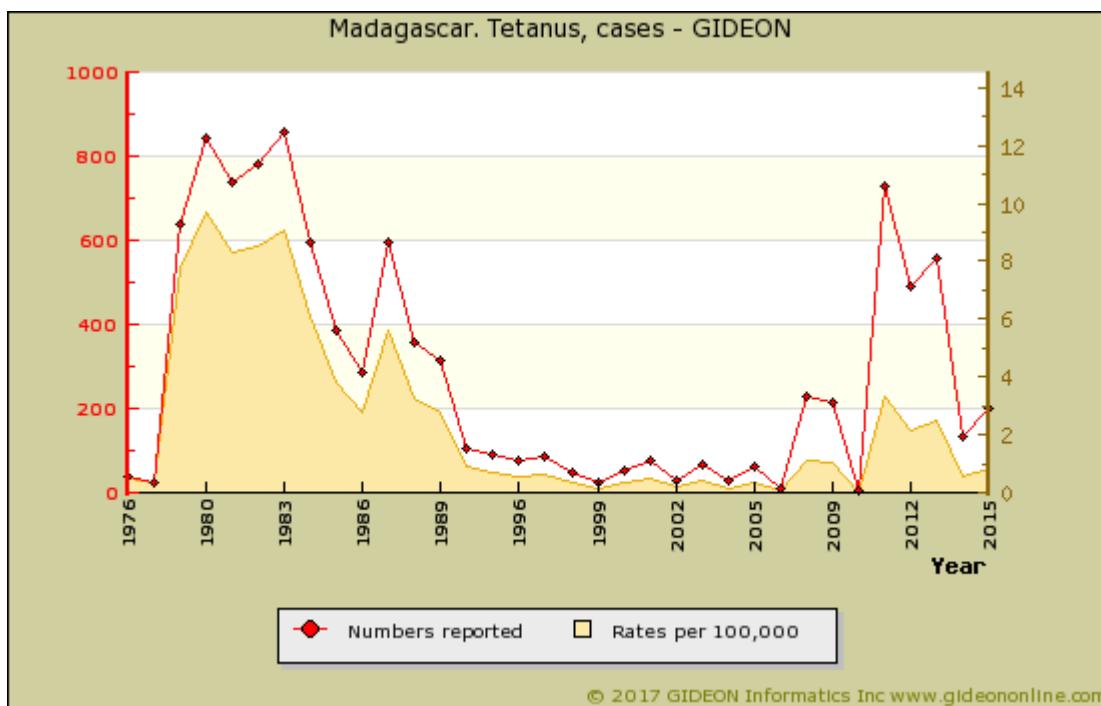
BCG - birth
DTwPHibHepB - 6,10,14 weeks
IPV - 14 weeks
Measles - 9 months
OPV - birth; 6,10,14 weeks
Pneumo conj - 6,10,14 weeks
Rotavirus - 6,10 weeks
TT - 1st contact pregnancy; +1, +6 months; +1, +1 year



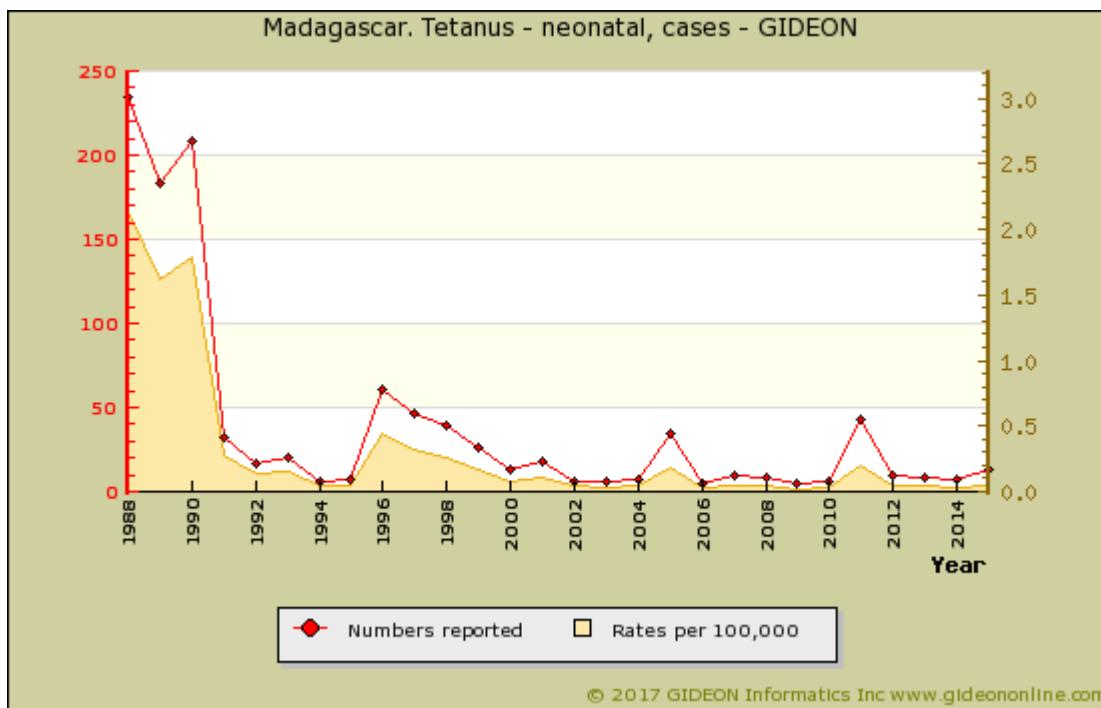
Graph: Madagascar. Tetanus - WHO-UNICEF est. vaccine (DTP3 %) coverage



Graph: Madagascar. Tetanus - WHO-UNICEF est. vaccine (TT2+ %) coverage



Graph: Madagascar. Tetanus, cases



Graph: Madagascar. Tetanus - neonatal, cases

Notes:

1. Also see reference ¹

References

1. Wkly Epidemiol Rec 2010 Sep 10;85(37):357-61.

Theleziasis

Agent	PARASITE - Nematoda. Secernentea: <i>Thelazia callipaeda</i> (rarely <i>T. californiensis</i>)
Reservoir	Dog, Rabbit, Deer, Cat
Vector	Fly (<i>Musca</i> and <i>Fannia</i> species)
Vehicle	None
Incubation Period	not known
Diagnostic Tests	Identification of parasite.
Typical Adult Therapy	Extraction of parasite
Typical Pediatric Therapy	As for adult
Clinical Hints	Conjunctivitis and lacrimation associated with the sensation of an ocular foreign body
Synonyms	Conjunctival spirurosis, Oriental eye worm, Rictularia, Thelazia californiensis, Thelazia callipaeda. ICD9: 372.15 ICD10: B83.8

Toxic shock syndrome

Agent	BACTERIUM. <i>Staphylococcus aureus</i> , <i>Streptococcus pyogenes</i> , et al - (toxins) Facultative gram-positive cocci
Reservoir	Human
Vector	None
Vehicle	Tampon (Bandage, etc)
Incubation Period	Unknown
Diagnostic Tests	Isolation of toxigenic <i>Staphylococcus aureus</i> . Toxin assay available in specialized laboratories.
Typical Adult Therapy	The role of topical (eg, vaginal) and systemic antistaphylococcal antibiotics is unclear; however, most authorities suggest intravenous administration of an anti-staphylococcal (anti-MRSA, anti-streptococcal as indicated) antibiotic.
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever (>38.9), hypotension (<90 mm Hg) and dermal erythema with desquamation Respiratory, cardiac or other disease present Most cases associated with "super absorbent" tampon use or staphylococcal wound infection Case-fatality rates of 5% to 10% are reported
Synonyms	Streptococcal toxic shock syndrome, TSS. ICD9: 040.82 ICD10: A48.3

Toxocariasis

Agent	PARASITE - Nematoda. Secernentea: <i>Toxocara cati</i> and <i>T. canis</i>
Reservoir	Cat, Dog, Mouse
Vector	None
Vehicle	Soil ingestion
Incubation Period	1w - 2y
Diagnostic Tests	Identification of larvae in tissue. Serology.
Typical Adult Therapy	Albendazole 400 mg BID X 5d. OR Mebendazole 100 to 200 mg PO bid X 5 days Add corticosteroids if eye, brain, heart or lung involvement is present.
Typical Pediatric Therapy	As for adult
Clinical Hints	Cough, myalgia, seizures and urticaria Hepatomegaly, pulmonary infiltrates or retrobulbar lesions may be present Marked eosinophilia is common Symptoms resolve after several weeks, but eosinophilia may persist for years
Synonyms	Ascaris suum, <i>Toxocara canis</i> , <i>Toxocara cati</i> , Toxocarose, Toxocarosis, Visceral larva migrans. ICD9: 128.0 ICD10: B83.0

Toxoplasmosis

Agent	PARASITE - Protozoa. Apicomplexa, Eimeriida: <i>Toxoplasma gondii</i>
Reservoir	Rodent, Pig, Cattle, Sheep, Chicken, Bird, Cat, Marsupial
Vector	None
Vehicle	Transplacental, Meat, Soil ingestion, Water , Milk, Filth flies
Incubation Period	1w - 3w (range 5d - 21d)
Diagnostic Tests	Serology. Cultivation or identification of organisms per specialized laboratories. Nucleic acid amplification.
Typical Adult Therapy	Pyrimethamine 25 mg/d + Sulfonamides 100 mg/kg (max 6g)/d X 4w - give with folinic acid. Alternatives: Clindamycin , Azithromycin , Dapsone . Spiramycin (in pregnancy) 4g/d X 4w
Typical Pediatric Therapy	Pyrimethamine 2 mg/kg/d X 3d, then 1 mg/kg/d + Sulfonamides 100 mg/kg/d X 4w - give with folinic acid. Alternatives: Clindamycin , Azithromycin , Dapsone .
Clinical Hints	Fever, lymphadenopathy, hepatic dysfunction or chorioretinitis Cerebral cysts often encountered in patients with AIDS Congenital hydrocephalus associated with mental retardation, seizures or blindness.
Synonyms	Toxoplasma, Toxoplasmose, Toxoplasmosi. ICD9: 130 ICD10: B58

Toxoplasmosis in Madagascar

Seroprevalence surveys

Years	Region	Study Group	%	Notes
2016*		fosa	93	93% of fosa (<i>Cryptoprocta ferox</i>) in two national parks (2016 publication) ¹
1996*	Tananarive	general population	52.1	52.1% of individuals in Tananarive (1996 publication) ²
2008*		lemurs	20	20% of white-fronted brown lemurs (<i>Eulemur fulvus albifrons</i> , 2008 publication) ³
1995*	Antananarivo	pregnant women	83.5	83.5% of pregnant women in Antananarivo (1995 publication) ⁴

* indicates publication year (not necessarily year of survey)

References

- 1. J Wildl Dis 2016 May 19;
- 2. Bull Soc Pathol Exot 1996 ;89(3):212-6.
- 3. J Zoo Wildl Med 2008 Dec ;39(4):567-75.
- 4. Bull Soc Pathol Exot 1995 ;88(1):46-9.

Trachoma

Agent	BACTERIUM. <i>Chlamydia trachomatis</i> , type A
Reservoir	Human
Vector	Fly
Vehicle	Secretions, Contact, Fly, Fomite
Incubation Period	5d - 12d
Diagnostic Tests	Culture or direct immunofluorescence of secretions. Serology. Nucleic acid amplification.
Typical Adult Therapy	Azithromycin 1 g po as single dose. OR Doxycycline 100 mg/day PO X 21 days. Also administer topical Tetracycline
Typical Pediatric Therapy	Azithromycin 20 mg/kg as single dose. Also administer topical Tetracycline
Clinical Hints	Keratoconjunctivitis with palpebral scarring and pannus formation 0.5% of infections result in blindness
Synonyms	Egyptian ophthalmia, Granular conjunctivitis, Kornerkrankheit, Trachom, Tracoma. ICD9: 076 ICD10: A71

Trichinosis

Agent	PARASITE - Nematoda. <i>Trichinella spiralis</i> (occasionally <i>T. nativa</i> , <i>T. britovi</i> , <i>T. pseudospiralis</i> , <i>T. nelsoni</i> , et al)
Reservoir	Wild carnivore, Omnivore, Marine mammal
Vector	None
Vehicle	Meat
Incubation Period	10d - 20d (range 1w - 10w)
Diagnostic Tests	Identification of larvae in tissue. Serology.
Typical Adult Therapy	Albendazole 400 mg PO BID X 14d. OR Mebendazole 200 to 400 mg PO tid X 3 days, then 400 to 500 mg PO. tid X 10 days. Give with prednisone 50 mg PO daily X 3 to 5 days (then 'taper' dosage)
Typical Pediatric Therapy	Albendazole 7 mg/kg BID X 14 d. OR Mebendazole 200 to 400 mg PO tid X 3 days, then 400 to 500 mg PO. tid X 10 days. Give with prednisone 50 mg PO daily X 3 to 5 days (then 'taper' dosage)
Clinical Hints	Early diarrhea and vomiting Subsequent myalgia, facial edema and eosinophilia Onset 1 to 4 weeks following ingestion of undercooked meat (usually pork) Symptoms may persist for two months Reported case-fatality rate for symptomatic infection is 2%
Synonyms	Haycocknema, Trichinellose, Trichinellosis, Trichinose, Trikinose, Triquiniasis, Triquonosis. ICD9: 124 ICD10: B75

Trichinosis in Madagascar

Trichinosis, cases: None reported between 1997 and 1998

Trichomoniasis

Agent	PARASITE - Protozoa. Metamonada, Parabasala, Trichomonadea. Flagellate: <i>Trichomonas vaginalis</i>
Reservoir	Human
Vector	None
Vehicle	Sexual contact
Incubation Period	4d - 28d
Diagnostic Tests	Microscopy of vaginal discharge. ELISA, culture, antigen detection tests available. Nucleic acid amplification.
Typical Adult Therapy	Metronidazole or Tinidazole 2g PO as single dose to both sexual partners
Typical Pediatric Therapy	Metronidazole 5 mg/kg PO TID X 7d. OR Tinidazole 50 mg/kg PO X 1 (maximum 2 grams)
Clinical Hints	Vaginal pruritus, erythema and thin or frothy discharge Mild urethritis may be present in male or female
Synonyms	Pentatrichomonas, Tetratrichomonas, Trichomonaden, Trichomonas, Trichomonas vaginalis, Trichomoniasis, Tritrichomonas. ICD9: 131 ICD10: A59

Trichomoniasis in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
2009*		sex workers	32	32% of CSW (2009 publication) 1
2005 - 2011	Antananarivo	victims	11.2	11.20% of rape victims in Antananarivo (2005 to 2011) 2

* indicates publication year (not necessarily year of survey)

References

1. [Med Mal Infect 2009 Dec ;39\(12\):909-13.](#)
2. [Med Sante Trop 2014 Dec 9;](#)

Trichuriasis

Agent	PARASITE - Nematoda. <i>Trichuris trichiura</i>
Reservoir	Human
Vector	None
Vehicle	Soil ingestion, Sexual contact, Flies
Incubation Period	2m - 2y
Diagnostic Tests	Stool microscopy or visualization of adult worms (adults are approximately 3 cm long).
Typical Adult Therapy	Mebendazole 100 mg PO BID X 3d. OR Albendazole 400 mg PO daily X 3 to 7 days OR Ivermectin 200 mg/kg PO daily X 3 days
Typical Pediatric Therapy	Albendazole 200 mg PO single dose OR Mebendazole 100 mg BID X 3 d (> age 2). OR Ivermectin 200 mg/kg PO daily X 3 days
Clinical Hints	Abdominal pain, bloody diarrhea Rectal prolapse or intestinal obstruction are occasionally encountered The parasite may survive for as long as five years in the human host
Synonyms	Trichocephaliasis, <i>Trichuris trichiura</i> , Tricuriasis, Whipworm. ICD9: 127.3 ICD10: B79

Trichuriasis in Madagascar

Prevalence surveys

Years	Region	Study Group	%	Notes
1998*	Southeastern Region	children	55	55% of children in the southeastern region (1998 publication) ¹
1981*	Eastern Region	general population	19.8	19.8% in rural eastern Madagascar (1981 publication) ²

* indicates publication year (not necessarily year of survey)

References

1. J Parasitol 1998 Jun ;84(3):480-4.
2. Arch Inst Pasteur Madagascar 1981 ;48(1):151-61.

Tropical phagedenic ulcer

Agent	BACTERIUM Mixed infection by <i>Fusobacterium</i> species and <i>Borrelia</i>
Reservoir	Human
Vector	None
Vehicle	Direct inoculation (skin trauma)
Incubation Period	Unknown
Diagnostic Tests	Wound smear suggestive of fusobacterial infection.
Typical Adult Therapy	Systemic Penicillin G . Excision/debridement as necessary
Typical Pediatric Therapy	As for adult
Clinical Hints	A deep, painful, foul-smelling ulcer (usually of the leg) with undermined edges May be complicated by secondary infection
Synonyms	Acute phagadenic ulcer, Aden ulcer, Delagoa sore, Malabar ulcer, Naga sore, Rhodesian sore, Tropical sloughing phagedaena. ICD9: 682.7 ICD10: A69.8,L97

Tropical pulmonary eosinophilia

Agent	UNKNOWN Possibly related to filarial infection
Reservoir	Unknown
Vector	Unknown
Vehicle	Unknown
Incubation Period	Unknown
Diagnostic Tests	Antifilarial antibodies may be present. Response to therapeutic trial.
Typical Adult Therapy	Diethylcarbamazine 2 mg/kg PO TID X 21d
Typical Pediatric Therapy	As for adult
Clinical Hints	Chronic cough, wheezing, dyspnea, reticular-nodular pulmonary infiltrates and eosinophilia (over 3,000 per cu. mm.) Acquired in countries known to be endemic for filariasis
Synonyms	

Tuberculosis

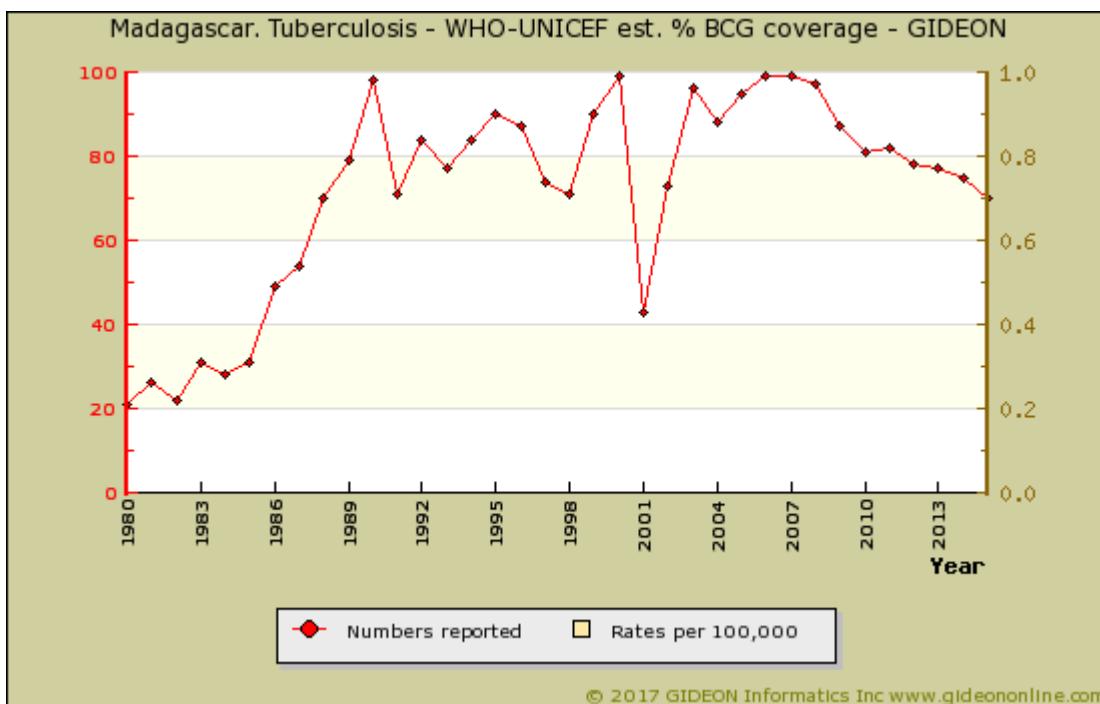
Agent	BACTERIUM. Actinomycetes, <i>Mycobacterium tuberculosis</i> An aerobic acid-fast bacillus
Reservoir	Human, Cattle
Vector	None
Vehicle	Air, Dairy products, Respiratory or pharyngeal acquisition
Incubation Period	4w - 12w (primary infection)
Diagnostic Tests	Microscopy. Culture. Nucleic acid amplification. Inform laboratory when this diagnosis is suspected.
Typical Adult Therapy	Respiratory isolation. Typical pulmonary infection is treated with 6 months of Isoniazid , Rifampin & Pyrazinamide
Typical Pediatric Therapy	As for adult
Vaccine	BCG vaccine
Clinical Hints	Cough, "night sweats" and weight loss Often presents as prolonged fever (FUO) or infection of bone, meninges, kidneys or other organs Most infections represent reactivation of old foci in lungs, brain, bone, kidneys etc
Synonyms	Consumption, <i>Mycobacterium africanum</i> , <i>Mycobacterium bovis</i> , <i>Mycobacterium caprae</i> , <i>Mycobacterium orygis</i> , <i>Mycobacterium tuberculosis</i> , Oryx bacillus, Phthisis, TB, TB meningitis, Tuberculose, Tuberculose miliar, Tuberculosis, Tuberculous meningitis, Tuberkulose, White plague. ICD9: 010,012,013,014,015,016,017,018 ICD10: A15,A16,A17,A18,A19

Tuberculosis in Madagascar

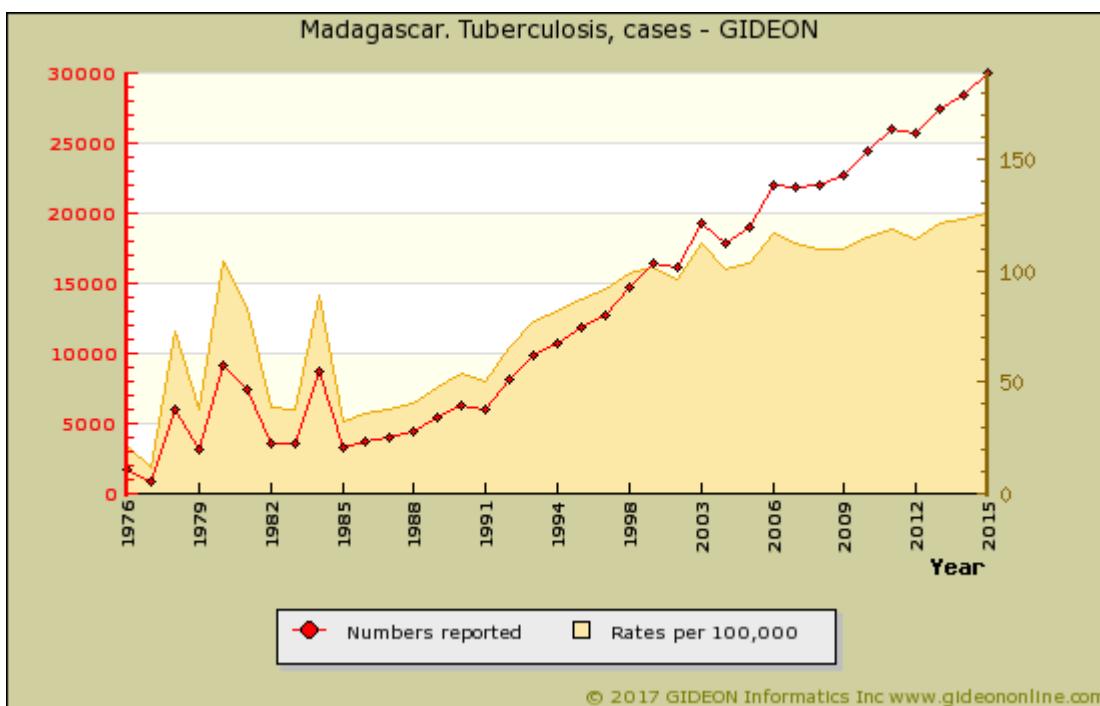
Vaccine Schedule:

BCG - birth
DTwPHibHepB - 6,10,14 weeks
IPV - 14 weeks
Measles - 9 months
OPV - birth; 6,10,14 weeks
Pneumo conj - 6,10,14 weeks
Rotavirus - 6,10 weeks
TT - 1st contact pregnancy; +1, +6 months; +1, +1 year

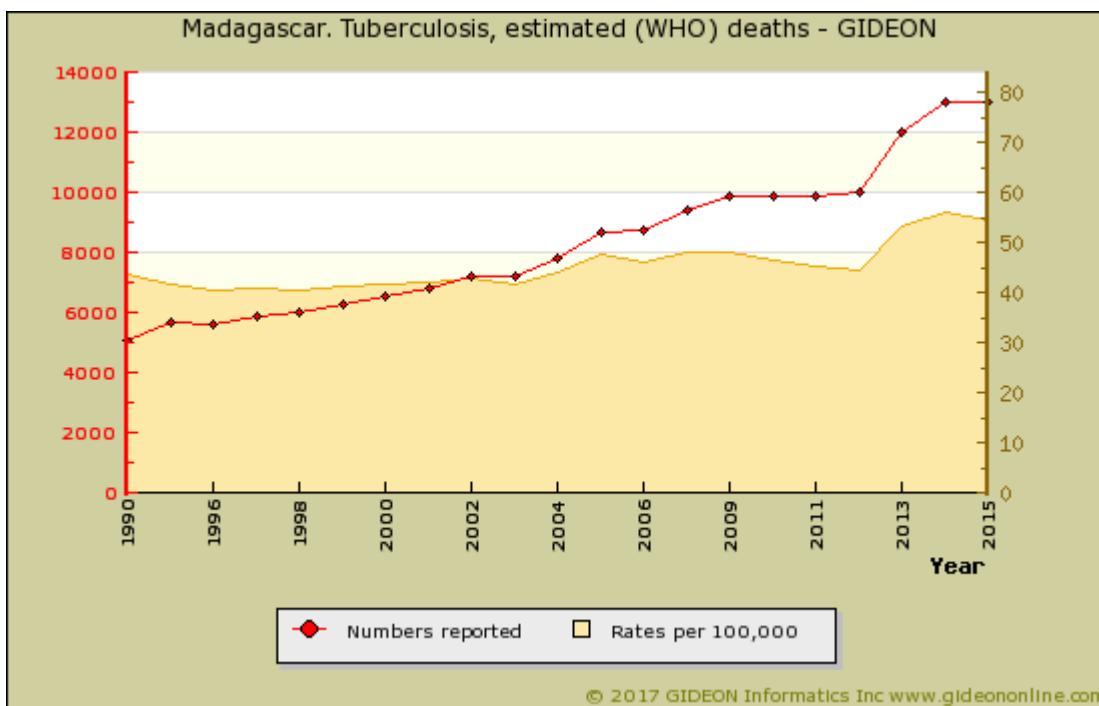
It is estimated that 9.6% of school children are infected by *M. tuberculosis* (1991 to 1994). ¹



Graph: Madagascar. Tuberculosis - WHO-UNICEF est. % BCG coverage



Graph: Madagascar. Tuberculosis, cases



Graph: Madagascar. Tuberculosis, estimated (WHO) deaths

Mycobacterium bovis accounts for 1.25% of patients with pulmonary tuberculosis and 1.3% of those with extrapulmonary infection in rural areas (1994 to 1995). ²

During 2005 to 2007, 3.7% of primary isolates were found to be resistant to INH and MDR was 0.2%. ³

- In 2007 INH resistance / MDR-TB was identified in 4.6% / 0.5% of new cases, and 9.8% / 3.9% of previously-treated cases. ⁴

References

1. Bull Soc Pathol Exot 1997 ;90(5):349-52.
2. Int J Tuberc Lung Dis 1999 Jul ;3(7):632-4.
3. Int J Tuberc Lung Dis 2010 Jun ;14(6):745-50.
4. ProMED <promedmail.org> archive: 20120206.1034331

Tungiasis

Agent	PARASITE - Insecta Siphonaptera (Flea), Tungidae: <i>Tunga penetrans</i> and <i>T. trimamillata</i> ("sand fleas")
Reservoir	Pig, Dog, Various other mammals
Vector	None
Vehicle	Contact
Incubation Period	8d - 12d
Diagnostic Tests	Identification of parasite.
Typical Adult Therapy	Extraction of parasite <i>Ivermectin</i> has been advocated in some publications.
Typical Pediatric Therapy	As for adult
Clinical Hints	Painful papule or nodule, usually on the feet - may be multiple Onset 1 to 2 weeks after walking on dry soil Secondary infections and tetanus are reported
Synonyms	Bicho de pe, Chica, Chigger, Chigoe flea, Jigger, Nigua, Puce-chique, Tu, <i>Tunga penetrans</i> , <i>Tunga trimamillata</i> , Tungosis. ICD9: 134.1 ICD10: B88.1

Tungiasis in Madagascar

Tungiasis is common in some regions of Madagascar. [1](#) [2](#) [3](#)

Notable outbreaks

Years	Cases	Population	Notes
2012	7	travelers	4

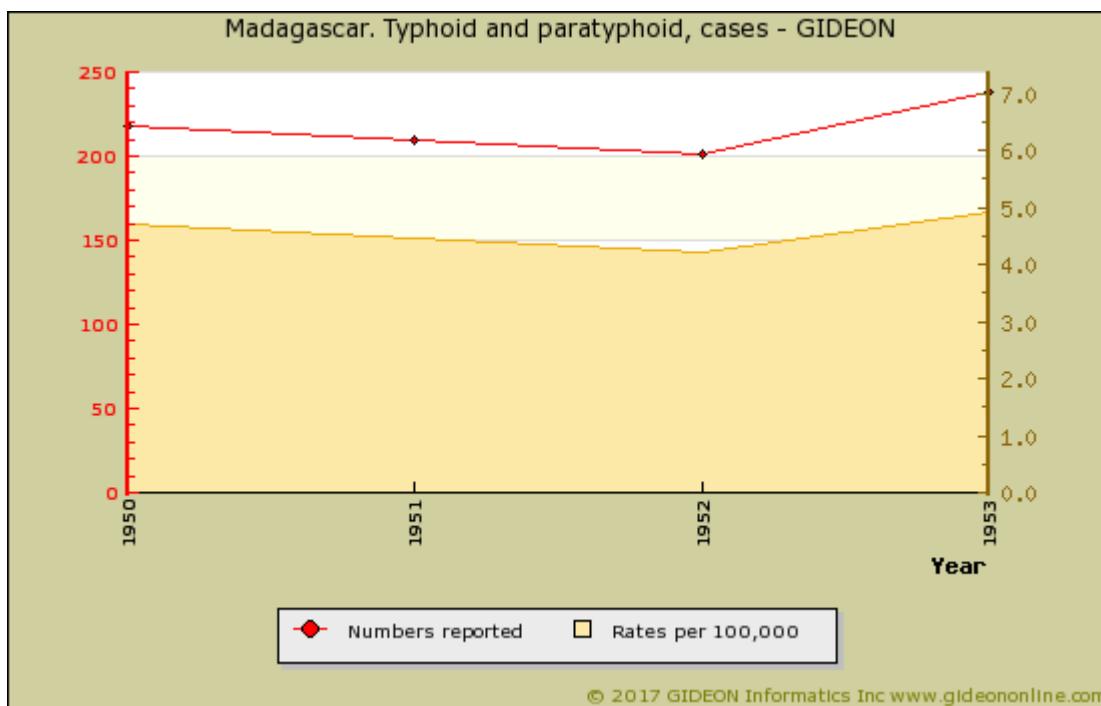
References

1. [Travel Med Infect Dis 2013 Nov-Dec;11\(6\):440-3.](#)
2. [PLoS Negl Trop Dis 2013 ;7\(9\):e2426.](#)
3. [Am J Trop Med Hyg 2013 Nov ;89\(5\):932-6.](#)
4. [J Travel Med 2015 Jul-Aug;22\(4\):263-6.](#)

Typhoid and enteric fever

Agent	BACTERIUM. <i>Salmonella</i> serotype Typhi (certain other <i>Salmonella</i> species cause 'paratyphoid' fever) A facultative gram-negative bacillus
Reservoir	Human
Vector	None
Vehicle	Fecal-oral, Food, Fly, Water
Incubation Period	15d - 21d (range 5d - 34d)
Diagnostic Tests	Culture (blood, urine, sputum culture). Stool usually negative unless late, untreated infection. Serology.
Typical Adult Therapy	Ceftriaxone 2 g IV q12h to q 24h X 5 to 7d. OR Azithromycin 1 gram PO on day 1; then 500 mg days 2 to 7. Fluoroquinolones resistance common - not recommended for empiric therapy. Add corticosteroids if evidence of shock or decreased mental status.
Typical Pediatric Therapy	Ceftriaxone 50 to 80 mg/kg IV daily X 5 to 7d. OR Azithromycin 15 mg/kg PO on day 1; then 7.5 mg/kg on days 2 to 7.
Vaccines	Typhoid - injectable vaccine Typhoid - oral vaccine
Clinical Hints	Transient diarrhea followed by fever, splenomegaly and obtundation Rose spots (during second week of illness), leukopenia and relative bradycardia are common Intestinal perforation or hemorrhage may occur in third to fourth week of illness Case-fatality rates are 0.8% (treated) to 15% (untreated)
Synonyms	Abdominal typhus, Abdominaltyphus, Buiktyphus, Enteric fever, Febbre tifoide, Febbre tifoidea, Fiebre tifoidea, Paratifoidea, Paratyfus, Paratyphoid, <i>Salmonella</i> serotype Typhi, Tyfoid, Typhoid, Typhoide. ICD9: 002 ICD10: A01

Typhoid and enteric fever in Madagascar

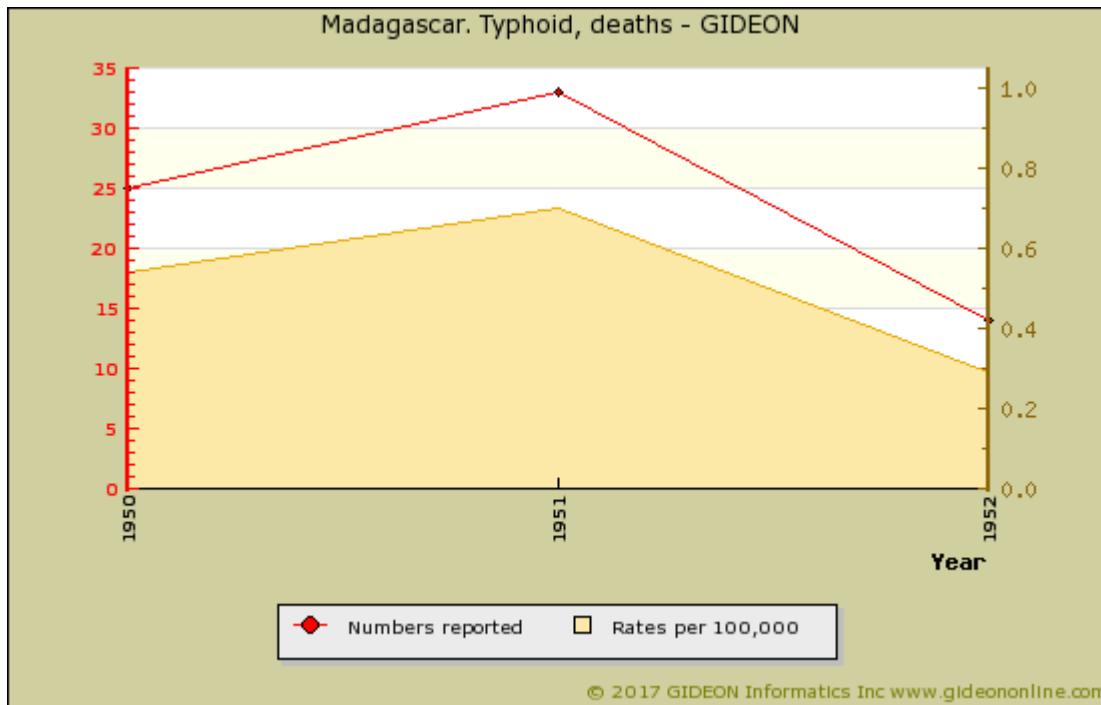


Graph: Madagascar. Typhoid and paratyphoid, cases

Notes:

1. During 1943 to 1949, the mean annual incidence was 402 cases ¹

A review of 200 cases of typhoid in Tananarive (1979 publication) - see reference ²



Graph: Madagascar. Typhoid, deaths

References

1. Bull World Health Organ 1955 ;13(1):173-91.
2. Med Trop (Mars) 1979 Jul-Aug;39(4):405-14.

Typhus - endemic

Agent	BACTERIUM. <i>Rickettsia typhi</i>
Reservoir	Rat
Vector	Flea (<i>Xenopsylla</i> or <i>Nosopsyllus</i> spp.)
Vehicle	None
Incubation Period	10d - 12d (range 4d - 18d)
Diagnostic Tests	Serology. Identification of rickettsiae in smear or culture of skin lesions. Nucleic acid amplification.
Typical Adult Therapy	Doxycycline 100 mg BID X 7d
Typical Pediatric Therapy	Doxycycline 2 mg/kg BID X 7d (maximum 200 mg/day); or Chloramphenicol 12.5 mg/kg QID X 7d
Clinical Hints	Fever, headache and myalgia Truncal maculopapular rash (present in 60%) appears on days 3 to 5 and persists for 4 to 8 days Fever resolves after 12 to 16 days Case fatality rate (untreated) is 2%.
Synonyms	Endemic typhus, Murine typhus, Rickettsia typhi, Ship typhus, Tifo murino, Tifus pulgas, Vlektyphus. ICD9: 081.0 ICD10: A75.2

Urinary tract infection

Agent	BACTERIUM OR FUNGUS. <i>Escherichia coli</i> , other facultative gram negative bacilli, enterococci, et al
Reservoir	Human
Vector	None
Vehicle	Endogenous
Incubation Period	Variable
Diagnostic Tests	Urine culture and leucocyte count.
Typical Adult Therapy	Antimicrobial agent(s) directed at known or likely pathogen
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, dysuria, frequency, flank pain and vomiting Infection in children or men - and infection which relapses in women - may warrant radiological studies to rule out underlying obstruction or calculus
Synonyms	Cistite, Cistitis, Cystite, Cystitis, Pielite, Pielitis, Pielonefrite, Pielonefritis, Prostatite, Pyelitis, Pyelonephrite, Pyelonephritis, Trigonitis, Tubulointerstitial nephritis, Urethritis, Uretrite, Zystitis. ICD9: 791.9,136.9,599.0,590,601.0 ICD10: N10,N30,N41

Vaccinia and cowpox

Agent	VIRUS - DNA. Poxviridae, Orthopoxvirus. Cowpox virus
Reservoir	Cattle, Cat Rodent
Vector	None
Vehicle	Cattle, Cat
Incubation Period	2d - 4d
Diagnostic Tests	Viral isolation from skin exudate or biopsy. Nucleic acid amplification. Biosafety level 3.
Typical Adult Therapy	Secretion precautions; supportive. In severe cases, Tecovirimat , 400 to 600 mg PO OD X 14 d.
Typical Pediatric Therapy	As for adult
Vaccine	Vaccinia immune globulin
Clinical Hints	Vesicles or pustules (usually on hand) progressing to crusts Painful regional lymphadenopathy Follows contact with infected animals or smallpox vaccination (largely abandoned); see Buffalopox (India note).
Synonyms	Akhmeta poxvirus, Aracatuba, Buffalopox, Camelpox, Cantagalo, Cowpox, Passatempo, Vaccinia, Vaiolo. ICD9: 051.0 ICD10: B08.0

Varicella

Agent	VIRUS - DNA. Herpesviridae, Alphaherpesvirinae: Human Herpesvirus 3 (Varicella-zoster virus)
Reservoir	Human
Vector	None
Vehicle	Air, Contact, Breastfeeding, Respiratory or pharyngeal acquisition
Incubation Period	2w - 3w
Diagnostic Tests	Viral culture (vesicles). Serology. Nucleic acid amplification.
Typical Adult Therapy	Respiratory isolation. Severe/complicated cases: Acyclovir 10 to 12 mg/kg IV q8h X 7d Adolescent / young adult: 800 mg PO X 5 per day X 7 d. Alternatives: Valacyclovir 1 g PO TID; or Famciclovir 500 mg PO TID
Typical Pediatric Therapy	Respiratory isolation. Acyclovir (severe/complicated cases) 150 mg/sq m IV q8h X 7d
Vaccines	Varicella vaccine Varicella-Zoster immune globulin
Clinical Hints	Cough and fever followed by a pruritic papulovesicular rash after 1 to 2 days Pneumonia is often encountered Case fatality rate is 4.3 per 100,000 cases (7% in immune-suppressed patients)
Synonyms	Chickenpox, Lechina, Skoldkopper, Vannkopper, Varicela, Varizellen, Vattenkopp, Waterpokken, Windpocken. ICD9: 052 ICD10: B01

Vibrio parahaemolyticus infection

Agent	BACTERIUM <i>Vibrio parahaemolyticus</i> A facultative gram-negative bacillus
Reservoir	Marine water, Seafood, Fish
Vector	None
Vehicle	Seafood
Incubation Period	10h - 20h (range 2h - 4d)
Diagnostic Tests	Stool culture - alert laboratory when this organism is suspected.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Vomiting and explosive diarrhea Onset 4 to 24 hours following ingestion of seafood (often steamed crabs) Diarrhea may persist for 7 to 10 days Case fatality rate is 0.1%
Synonyms	Vibrio parahaemolyticus. ICD9: 005.4 ICD10: A05.3

Wesselsbron

Agent	VIRUS - RNA. Flaviviridae, Flavivirus: Wesselsbron virus
Reservoir	Sheep, Cattle
Vector	Mosquito (<i>Aedes</i> sp., <i>Anopheles gambiae</i> , <i>An. pharoensis</i> , <i>Culex telesilla</i> , <i>Cx. univittatus</i> , <i>Mansonia uniformis</i>)
Vehicle	None
Incubation Period	2d - 4d
Diagnostic Tests	Viral culture (blood, throat). Serology. Biosafety level 3.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Fever, myalgia, arthralgia, dermal hyperesthesia, maculopapular rash and leukopenia Illness lasts up to 10 days No fatalities reported
Synonyms	

Wesselsbron in Madagascar

Wesselsbron virus has been recovered from mosquitoes (*Aedes circumluteolus*) in Madagascar. ¹

- Seropositive lemurs have been identified.

References

1. Arch Inst Pasteur Madagascar 1990 ;57(1):183-92.

West Nile fever

Agent	VIRUS - RNA. Flaviviridae, Flavivirus: West Nile virus A subtype of West Nile virus, Kunjin virus, is associated with human disease in Oceania and Asia
Reservoir	Bird, Horse, Bat, Tick
Vector	Mosquito (<i>Culex univittatus</i> , <i>Cx. pipiens</i> , <i>Cx. vishnui</i> , <i>Cx. naevaei</i> , <i>Coquillettidia</i> , <i>Aedes</i> and <i>Anopheles</i> spp.)
Vehicle	Blood, Breastfeeding
Incubation Period	3d - 6d (range 1d - 14d)
Diagnostic Tests	Viral culture (blood, CSF). Serology. Nucleic acid amplification. Biosafety level 3.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Clinical Hints	Myalgia, arthralgia, lymphadenopathy, headache, conjunctivitis and a macular rash Sporadic instances of encephalitis, meningitis and myocarditis are reported Kunjin virus is similar, but often associated with arthralgia, myalgia and rash Illness resolves within one week in most cases
Synonyms	Bagaza, Fiebre del Oeste del Nilo, Kunjin, Lourdige, Near Eastern equine encephalitis, Ntaya, Usutu, WNF. ICD9: 066.4 ICD10: A92.3

West Nile fever in Madagascar

2011 - A woman died of West Nile fever after returning to Reunion from Madagascar. [1](#) [2](#)

Seroprevalence surveys

Years	Region	Study Group	%	Notes
2013*		birds	28.7	28.7% of adult poultry in an endemic area (2013 publication) 3
2016*	multiple locations	birds	16.7-29.4	29.4% of domestic birds in Antsalova and 16.7% in Mitsinjo (2016 publication) 4
1988 - 1989	Highlands	general population	13.4-21.8	13.4% to 21.8% in the Central Highlands (1988 to 1989) 5
1991*		general population	29.9	29.9% below the age of 20 (1991 publication) 6
1996	Ambositra	general population	2.1	2.1% of individuals in Ambositra (Highlands, 1996)
1999	Mahajanga	general population	10.65	10.65 in Mahajanga (1999) 7
2004	Southwestern Region	lemurs	94	94% of ring-tailed lemurs (<i>Lemur catta</i>) (Southwestern Madagascar, 2004) 8

* indicates publication year (not necessarily year of survey)

The virus has been found in parrots (*Coracopsis vasa*), egrets (*Bulweria ibis*) and lemurs (*Lemur fulvus*) [9](#)

Vectors:

235 mosquito species are found on Madagascar, including 29 which are considered competent vectors for West Nile fever. As of 2016, the virus had been identified in 16 species. [10](#)

- Mosquito vectors include *Culex decens*, *Cx. quinquefasciatus*, *Cx. tritaeniorhynchus*, *Cx. antennatus*, *Cx. univittatus*, *Aedes albcephalus*, *Ae. circumluteolus*, *Stegomyia (Aedes) aegypti*, *Ae. madagascarensis*, *Anopheles brunnipes* and *An. maculipalpis*. ¹¹
- West Nile virus RNA has also been identified in *Aedeomyia madagascarica* and *Anopheles pauliani*. ¹²

Notable outbreaks

Years	Population	Notes
2009	birds	13

References

- [1. Am J Trop Med Hyg 2013 Aug ;89\(2\):211-3.](#)
- [2. Parasite 2016 ;23:49.](#)
- [3. Am J Trop Med Hyg 2013 Aug ;89\(2\):211-3.](#)
- [4. PLoS One 2016 ;11\(1\):e0147589.](#)
- [5. Ann Soc Belg Med Trop 1990 Mar ;70\(1\):55-63.](#)
- [6. Bull Soc Pathol Exot 1991 ;84\(3\):225-34.](#)
- [7. Arch Inst Pasteur Madagascar 2003 ;69\(1-2\):33-6.](#)
- [8. J Wildl Dis 2007 Jan ;43\(1\):40-7.](#)
- [9. Trans R Soc Trop Med Hyg 1982 ;76\(2\):227-31.](#)
- [10. Parasite 2016 ;23:49.](#)
- [11. Ann Soc Belg Med Trop 1989 Sep ;69\(3\):233-43.](#)
- [12. PLoS One 2016 ;11\(1\):e0147589.](#)
- [13. ProMED <promedmail.org> archive: 20100522.1704](#)

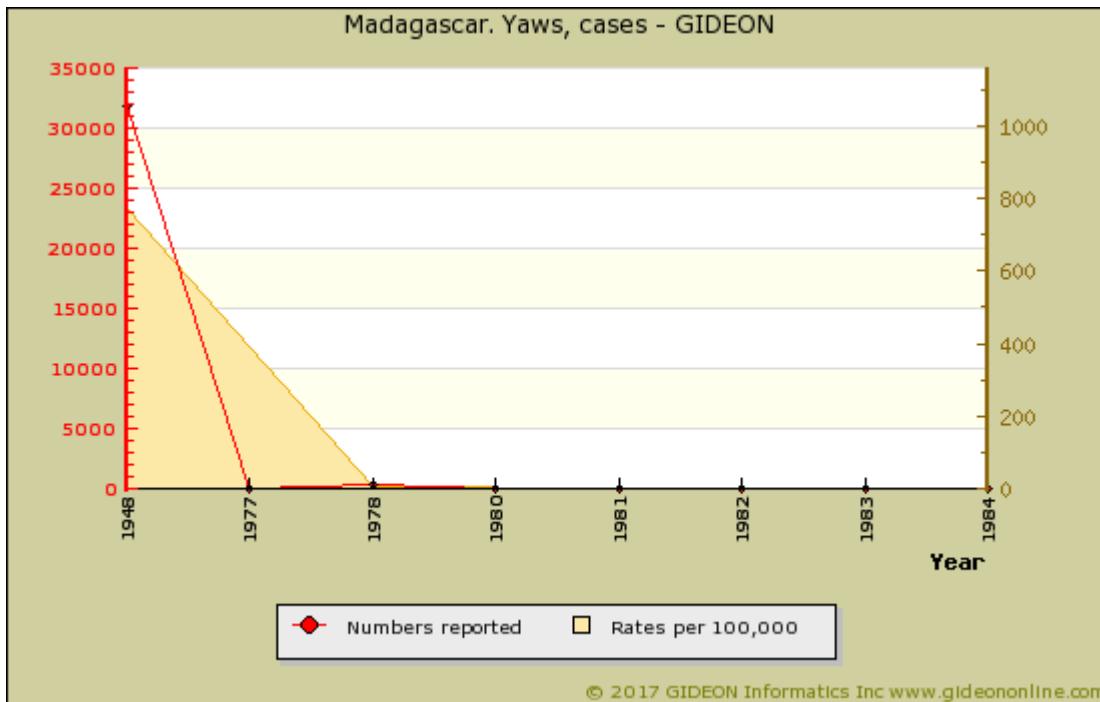
Whipple's disease

Agent	BACTERIUM. Actinomycetes, <i>Tropheryma whipplei</i> A gram positive bacillus
Reservoir	Unknown
Vector	None
Vehicle	None
Incubation Period	Unknown
Diagnostic Tests	Identification of inclusions in lamina propria (other tissues). Tissue culture. Nucleic acid amplification.
Typical Adult Therapy	<p>Ceftriaxone 2.0 g IV daily X 14 days. OR Penicillin G 12 million u + Streptomycin 1 g daily X 14d. Then, Sulfamethoxazole / Trimethoprim X 1 year</p> <p>OR: Doxycycline 100 mg PO BID + Hydroxychloroquine X 1 year, followed by Doxycycline for life</p>
Typical Pediatric Therapy	Disease is rarely, if ever, encountered in children
Clinical Hints	Chronic multisystem disorder characterized by weight loss, diarrhea, abdominal and joint pain Dermal hyperpigmentation, fever and lymphadenopathy are often present <i>Tropheryma whipplei</i> has recently been recovered from the blood of patients with fever, headache or cough.
Synonyms	Intestinal lipodystrophy, Lipophagic granulomatosis, Mesenteric chyladenectasis, Steatorrhea arthropericarditica, <i>Tropheryma whipplei</i> . ICD9: 040.2 ICD10: K90.8

Yaws

Agent	BACTERIUM. <i>Treponema pallidum</i> subsp. <i>pertenue</i> : microaerophilic gram-negative spirochete
Reservoir	Human, Non-human primate
Vector	None
Vehicle	Contact, Insect bite, Fomite
Incubation Period	3w - 5w (range 10d - 12w)
Diagnostic Tests	VDRL and antitreponemal tests (FTA, MHTP) positive as in syphilis.
Typical Adult Therapy	Azithromycin 30 mg/kg p.o. as single dose OR Benzathine Penicillin G 1.2 million units IM as single dose.
Typical Pediatric Therapy	Azithromycin 30 mg/kg p.o. as single dose OR Benzathine Penicillin G : Weight <14kg: 300,000u IM Weight 14 to 28kg: 600,000u IM Weight >28kg - 1.2 million u IM
Clinical Hints	Dermal papillomata, periostitis and soft tissue suppuration Regional lymphadenopathy is common Relapses often seen during the initial 5 years of illness Gummata and hyperkeratotic plaques appear in advanced stages of the infection
Synonyms	Anakhre, Bouba, Breda's disease, Charlouis' Disease, Frambesia, Gangosa, Goundou, Granuloma tropicum, Gundo, Henpue, Henpuye, Ogo Mutilans, Parangi, Patek, Pian, <i>Treponema pallidum</i> subsp <i>pertenue</i> . ICD9: 102 ICD10: A66

Yaws in Madagascar



Graph: Madagascar. Yaws, cases

Yellow fever

Agent	VIRUS - RNA. Flaviviridae, Flavivirus: Yellow fever virus
Reservoir	Human, Mosquito, Monkey, Marsupial
Vector	Mosquito (<i>Stegomyia (Aedes)</i> , <i>Haemagogus</i> , <i>Sabettus</i>)
Vehicle	None
Incubation Period	3d - 6d (range 2.5d - 14d)
Diagnostic Tests	Viral culture (blood, liver). Serology. Nucleic acid amplification. Biosafety level 3.
Typical Adult Therapy	Supportive
Typical Pediatric Therapy	As for adult
Vaccine	Yellow fever vaccine
Clinical Hints	Headache, backache, vomiting, myalgias, jaundice and hemorrhagic diathesis Relative bradycardia and leukopenia are present Illness is often biphasic Case fatality rate is 10% to 60%, within 7 days of onset
Synonyms	Bulan fever, Febbre gialla, Febre amarela, Fever of Fernando Po, Fever of the blight of Benin, Fiebre amarilla, Fievre jaune, Gelbfieber, Gele koorts, Gul feber, Gula febern, Inflammatory fever, Kendal's disease, Magdalena fever, Maladie de Siam, Pest of Havana, Stranger's fever. ICD9: 060 ICD10: A95

Although Yellow fever is not endemic to Madagascar, imported, expatriate or other presentations of the disease have been associated with this country.

Yellow fever in Madagascar

Yellow fever does not occur in Madagascar.

In recent years, the range of *Ae. aegyptius* in Madagascar has become more restricted (2007 to 2009). ¹

Proof of vaccination **IS** required for travelers arriving from a country with risk of yellow fever transmission and >= 9 months of age, including transit >12 hours in an airport located in a country with risk of YFV transmission. This country considers the certificate of YF vaccination to be valid for life.

References

1. [Parasit Vectors](#) 2012 Mar 20;5:56.

Yersiniosis

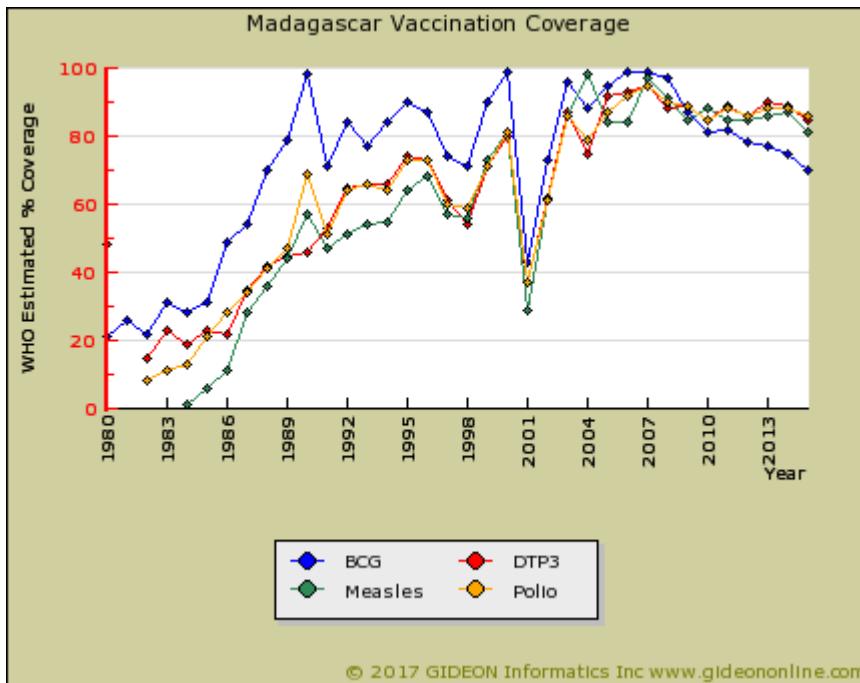
Agent	BACTERIUM. <i>Yersinia enterocolitica</i> and <i>Yersinia pseudotuberculosis</i> A facultative gram-negative bacillus
Reservoir	Pig, Rodent, Rabbit, Sheep, Goat, Cattle, Horse, Dog, Cat, Bat
Vector	None
Vehicle	Food, Water, Meat, Dairy products, Vegetables, Fecal-oral, Blood
Incubation Period	4d - 7d (range 1d - 11d)
Diagnostic Tests	Culture stool, blood. Alert laboratory when these organisms are suspected.
Typical Adult Therapy	Stool precautions; diarrhea is self-limited. If severe disease - Ciprofloxacin 500 mg BID X 5 to 7d. OR Sulfamethoxazole / Trimethoprim
Typical Pediatric Therapy	Stool precautions; diarrhea is self-limited. If severe disease - Sulfamethoxazole / Trimethoprim 20 mg-4 mg/kg BID X 5 to 7d
Clinical Hints	Fever, diarrhea, and right lower quadrant pain Fecal leucocytes present May be associated with rheumatologic manifestations such as erythema multiforme, Reiter's syndrome and chronic arthritis
Synonyms	Far East scarlet-like fever, FESLF, <i>Yersinia enterocolitica</i> , <i>Yersinia pseudotuberculosis</i> , Yersiniose. ICD9: 008.44 ICD10: A04.6,A28.2

Zygomycosis

Agent	FUNGUS. Zygomycota, Zygomycetes, Mucorales: <i>Mucor</i> spp., <i>Rhizopus</i> spp., <i>Lichtheimia</i> (formerly <i>Absidia</i>) spp., <i>Saksenaea</i> spp, et al
Reservoir	Saprophytes
Vector	None
Vehicle	Air, Bandages, Contact, Respiratory or pharyngeal acquisition
Incubation Period	Variable
Diagnostic Tests	Fungal smear and culture.
Typical Adult Therapy	Amphotericin B to maximum dose 0.8 mg/kg/d; and to total dose of 3g. Excision as indicated
Typical Pediatric Therapy	Amphotericin B max dose 0.8 mg/kg/d; and to total dose of 40 mg/kg. Excision as indicated
Clinical Hints	Periorbital pain, sinusitis, and palatal, nasal or cerebral infarcts Occurs in the setting of preexisting acidosis (diabetes, uremia) Pulmonary infection may complicate leukemia
Synonyms	Absidia, Actinomucor, Apophysomyces, Cokeromyces, Cunninghamella, Hormographiella, Lichtheimia, Lichtheimia, Mucor, Mucormycosis, Mycocladus, Phycomycosis, Rhizomucor, Rhizopus, Saksenaea, Syncephalastrum. ICD9: 117.7 ICD10: B46

Vaccine Schedule and coverage for Madagascar

BCG - birth
 DTwPHibHepB - 6,10,14 weeks
 IPV - 14 weeks
 Measles - 9 months
 OPV - birth; 6,10,14 weeks
 Pneumo conj - 6,10,14 weeks
 Rotavirus - 6,10 weeks
 TT - 1st contact pregnancy; +1, +6 months; +1, +1 year



A given generic vaccine may have multiple designations in this list due to variations in terminology used by individual countries. Vaccination policies evolve rapidly in response to changes in disease occurrence and the introduction of new vaccines. Every effort has been made to update these lists accordingly.

Vaccine Abbreviations

aP - Attenuated pertussis
 ap - Attenuated pertussis
 BCG - Bacillus Calmette Guerin
 CBAW - Childbearing age women
 D - Diphtheria
 HCW - Health-care workers
 Hep - Hepatitis B
 HEP - Hepatitis B
 HepA - Hepatitis A
 HepB - Hepatitis B
 Hib - Haemophilus influenzae type B
 HPV - Human papillomavirus
 IPV - Injectable polio vaccine
 MenACWY - Meningococcus types A,C,Y and W
 MenC-conj - Meningococcus type C conjugate
 MR - Measles, Rubella
 MMR - Measles, Mumps, Rubella
 MMRV - Measles, Mumps, Rubella, Varicella
 NA - Details not available
 OPV - Oral polio vaccine
 P - Pertussis
 Pneumo - Pneumococcal vaccine
 Pneumo conj - Pneumococcal conjugate
 Pneumo ps - Pneumococcal polysaccharide
 T - Tetanus
 TBE - Tick-borne encephalitis

Td - Tetanus lower dose diphtheria

TT - Tetanus toxoid

wP - Whole-cell pertussis

YF - Yellow fever

Zoster - Herpes zoster

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